

The South Australian Naturalist

The Journal of the Field Naturalists' Section of the Royal
Society of South Australia.

Adelaide

VOL. V



Nov., 1923

No. 1

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Each writer is responsible for the individual opinions expressed and
the facts submitted.

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Office Bearers, 1923-24.

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W. Pearce and T. Hogan and the Chairman and Secretary of the Flora
and Fauna Protection Committee.

Hon. Auditors—Messrs. W. D. Reed, F.C.P.A., and A. J. Morison.

“The South Australian Naturalist”—Editor, Mr. Wm. Ham,
F.R.E.S. Address: The University, Adelaide.

FORTHCOMING EXCURSIONS.

Nov. 24—Aldgate. Visit Mr. G. T. Lane's Garden. Train 1.24 p.m.
Leader, Mr. E. S. Hughes.

1924.

Jan. 26.—Outer Harbour. Dredging. Train, 1.35. Leaders, Messrs.
Kimber and Beck.

EVENING LECTURES.

Nov. 20—Photo. Evening. Members are invited to bring photos to
be shown in the Episcopo, or slides to be shown by the lantern,
as well as Exhibits of any specimens of natural history.

Dec. 18—Mr. T. D. Campbell, B.D.S., will give a lecture on “Pearson
Island.” Please note that this lecture will be given in the Lec-
ture Room.

. . The . .

South Australian Naturalist.

Vol. V. ADELAIDE, NOVEMBER, 1923 No. 1

OUR SHOW.

This year the Annual Show was held in the Town Hall, kindly lent to the Section by the Lord Mayor (Mr. Cohen). Fears had been expressed by our members that we should not be able to fill the hall, but the space proved none too ample for the wealth of exhibits.

In the absence of the Lord Mayor, Sir Frank Moulden declared the Show open. The President, Professor Cleland, in welcoming Sir Frank Moulden, referred to the inevitable destruction of natural beauty entailed by the growth of the city. It was the aim of the Section to bring some of this beauty under the notice of citizens, and to enlist their interest in the study and the preservation of our native flora and fauna.

Sir Frank Moulden, in declaring the exhibition open, referred most sympathetically to the work of the Section in the study of natural history.

The "massed effects" were displayed on a long table in the centre of the hall. Dinner tables were shown decorated with native flowers, the natural effect of grace and daintiness being enhanced by their clever arrangement. An exhibit of "gum nuts," staged by the President, showed the great variety to be found in the fruits of different species of eucalypts.

The S.A. Museum contributed a very fine exhibit of pictures painted by the Director, Mr. Edgar R. Waite, and a large selection of insects shown by Mr. A. M. Lea.

The exhibit of different forms of pond life, in simple aquaria arranged by Mr. A. G. Edquist, attracted great attention, as did the extensive exhibits of Mr. W. J. Kimber, Mr. Looker, and Mr. C. Walton, including Australian and foreign shells and fossils.

Mr. T. P. Bellchambers showed a collection of photographs of the mallee fowl, as well as eggs of the bird. Mr. Bellchambers kept a series of visitors interested in his explanations of the wonderful habits of this bird.

The microscopic section was also very attractive, Dr. Pulleine and Messrs. Baker, Elston, and Kemp showing a varied assortment of living objects, as well as mounted specimens.

Captain White spoke on the usefulness of many of the native birds, and his lectures, illustrated as they were by a fine case of specimens, attracted large crowds of interested listeners.

Mr. N. B. Tindale made a fine display of spears, implements, boats, ceremonial objects, articles of dress, dishes, bags, ornaments, and fishing materials from Groote Eylandt, in the Gulf of Carpentaria. Mr. Tindale was the first naturalist to visit the island, and was able to make a very large collection for the Museum. His talks, too, were greatly appreciated, adding greatly to the interest of the exhibits.

Mr. S. W. Jackman showed specimens of the native timbers of the principal Australian States, and Messrs. A. J. Wiley and G. Haskard showed what artistic things could be made from odd pieces of native timbers.

In the banqueting-room Messrs. James Marshall & Co., the Australasian Implement Company, and Messrs. Harris, Scarfe, Ltd., showed artistic furniture made from Australian woods.

Messrs. Pengelley & Co. showed native woods, and Messrs. H. Morell & Co. showed bats made locally from willow grown in South Australia.

Mr. H. H. Corbin, of the University Department of Forestry, also made an exhibition of native woods.

The large collection of humming birds exhibited by Mr. Edwin Ashby attracted general attention. Mr. Ashby also showed a fine collection of Chitons.

The Aquarium Society was represented by a number of aquaria, arranged by Mr. B. B. Beck.

Miss Alison Ashby showed a collection of 100 paintings of native flowers.

The prizes for painting were awarded as follows:—

Water Colours.—First, Miss Evelyn White (eucalyptus); second, Miss Lois Laughton (waratah); third, Miss Evelyn White (phebalium).

Oil Colours.—First, Mrs. Tamblyn (Christmas bush); second, Miss M. F. Robjohns (waratah).

Mr. Ising showed a number of herbarium specimens, arranged to show the manner in which specimens should be prepared, dried, and mounted, with a map of the State showing the vegetation characteristic of its various botanical regions.

Among the miscellaneous exhibits was a grass tree, shown by Mr. Hogan.

Prof. Wood Jones showed specimens of South Australian mammals from Franklin Island, including bandicoots, bilbies, opossums, and rats.

A number of splendid photographs of Queensland forest scenes were lent by the Queensland Government Botanist.

Miss Leicester showed a small case containing porcelain brooches, beautifully painted with nature subjects.

Cole's Book Arcade made a fine exhibit of books on Australian Nature Study. Mr. A. J. Morison showed specimens of wood riddled by the teredo worm. Mr. Hale, of the S.A. Museum, showed some very fine microphotographs, taken by himself.

Miss Naughton, of Eden Hill, showed a splendidly preserved case of wild flowers, which had been dried in sand. The natural appearance was very striking. Both colour and shape were perfectly preserved.

Miss Irene Elliot Crossing showed an original design in art needlework, based on a native flower (*Grevillea*).

To the botanist, perhaps the most interesting part of the show was provided by the tables containing named specimens. Over 180 species were exhibited, including 22 species of orchids.

Among the persons who sent in wild flowers, Mrs. Page, of Myponga, deserves special mention. Four boxes were sent in by her during the course of the show. Dr. Moulden, of Broken Hill, forwarded three boxes of Sturt peas, and Mr. C. W. D'Alton a box of wild flowers from Hall's Gap, in the Grampians, Victoria.

Mr. W. C. Hackett secured a good supply of waratahs, grown near Sydney. Mr. A. K. Newberry, of Mount Lofty, and Mr. C. Lenz, of Moe, Victoria, forwarded flowers, and boxes were received from the Naturalists' Society of New South Wales, the Field Naturalists' Club of Victoria, the Barrier Field Naturalists' Club, and the Queensland Naturalists' Club.

The prizes were awarded to the following Schools:—

1. Quorn School (H.T., Mr. A. G. Tregenza).
2. Inman Valley (Miss A. Adcock).
3. Pinnaroo (Mr. A. Rendell).
4. Stirling East (Mr. E. M. Adams).
5. Crafers (Mr. D. D. Smith).
6. Bordertown (Mr. W. S. Hutley).

Other Schools sending flowers included McLaren Flat (Miss M. I. Hansberry), Sedan (Mr. W. Leslie), Keyneton (Mr. E. Fitzsimmons), Victor Harbour (Mr. Le Lacheur), (Mr. W. M. Ashby), Snowtown (Mr. H. Freidrichs), Naturi

Uraidla (Mr. Galle), Wood's Point (Mr. G. G. Cain), Coromandel Valley (Mr. N. Opie), Mylor (Mr. M. J. O'Shaughnessy), Mount Compass (Miss E. E. Uppill), Myponga (Miss C. E. Whittingham), and Hindmarsh Tiers (Mr. R. Ryan).

The prizes offered for Posters resulted in some fine posters being entered for competition. The first prize was gained by Mr. W. J. Hosking, of Sydenham Road, Norwood. The second prize was won by Miss Erica Hosking, and the third by Miss D. Nicholls.

The various committees worked with great enthusiasm. Everyone recognised that it was no light task to fill the Town Hall with exhibits, and to carry out the thousand and one details of organisation.

Where all worked so enthusiastically, it would be invidious to particularise. The General Committee consisted of the President (Prof. Cleland), Mr. J. F. Bailey, Dr. C. Fenner, Dr. Pulleine, Captain White, Messrs. Selway, Black, Edquist, Hackett, Kimber, Lea, Nettelbeck, Hughes, Jackman, Elston, Beck, Burdett, Looker, Sutton, Glastonbury, Hogan, and Ham, Mr. and Mrs. C. Pearce, Mr. and Mrs. Rosser, Mesdames A. Day, H. P. Robson, S. A. White, and Hackett, Misses I. Roberts, M. Roeger, E. Ireland, C. A. Benda, M. L. Benda, A. Simpson, and Hackett, with Mr. E. H. Ising, Secretary.

The scientific classification was in the capable hands of Messrs. J. M. Black, J. F. Bailey, W. Champion Hackett, and A. G. Edquist, Dr. Rogers, and Prof. Osborn.

The display of flowers was carried out by a Committee including Miss I. Roberts (convener), Misses Munns, Roeger, Robson, N. Taylor, N. Roberts, Watson, Faehse, Featherstone, Croker, E. Simpson, E. Benda, and Hocking, Mesdames Black, Robson, Day, N. Roberts, Law, Rosser, Elliott, and Hackett, and Messrs. E. S. Hughes, A. J. Morison, F. Clark, Stokes, Rosser, Pearce, and Colbert.

The paintings were arranged by Mr. L. H. Howie and Miss C. A. Benda.

The Sales Stall was kept busy by the management and skilful salesmanship of Mrs. C. Pearce and the Misses Isabel Hackett, Erica Hosking, Legge, and Vohr.

Special thanks are due to Mr. A. J. Morison, and to Mr. J. F. Bailey, who gave great assistance in preparing the exhibition.

As in former years, Mr. S. W. Jackman managed the printing, distribution, and sale of tickets, etc. Messrs. Hanley and Harrington assisted in this work.

The advertising, press reports, etc., were in the hands of a committee consisting of Messrs. D. J. McNamara, Ising, and Ham.

ANNUAL MEETING, SEPTEMBER 25, 1923.

The Chairman (Mr. Ham) presided over a good attendance.

Minutes having been duly read and confirmed, the annual report, the Librarian's report, and the Treasurer's report and balance-sheet were read and confirmed.

The Chairman gave a short address on the importance of the work of nature study in the field.

The following officers were elected: Chairman: Prof. J. B. Cleland, M.D.; Vice-Chairmen, Mr. E. S. Hughes, Prof. T. Harvey Johnston, M.A., D.Sc.; Hon. Secretary, Mr. E. H. Ising; Assistant Secretary, Miss E. Ireland; Treasurer, Mr. B. B. Beck; Librarian, Miss I. Roberts; Press Correspondent, Mr. D. J. McNamara; Publicity Secretary, Miss Roeger; Excursion Secretary, Mr. A. J. Morison; Committee, Dr. C. Fenner, F.G.S., Messrs. J. F. Bailey, W. Ham, F.R.E.S., W. H. Selway, W. J. Kimber, S. W. Jackman, W. Champion Hackett, F.R.H.S., C. Pearce, and T. Hogan, and the Chairman and Secretary of the Flora and Fauna Protection Committee; Hon. Auditors, Messrs. D. Reed, F.C.P.A., and A. J. Morison; Editor, "The South Australian Naturalist," Mr. Wm. Ham, F.R.E.S.

Votes of thanks were passed to the retiring officers.

Exhibits included photos of the Orchid *Dendrobium*, shown by Mrs. C. Catt, of Yatala.

Mr. Kimber made an exhibit of shells.

THIRTY-FOURTH ANNUAL REPORT OF THE NATIVE FAUNA AND FLORA PROTECTION COMMITTEE.

For the Year ended September 20th, 1923.

Three meetings were held during the year

A report having been sent to the Committee that shooting was taking place on the Baroota Reservoir, a letter was written to the Hydraulic Engineer with reference to that case, and at the same time he was asked as to the position with regard to other reservoirs under the supervision of the Water and Sewers Department. His reply was that "The shooting of birds and other native fauna on the Reservoirs Reserves by the public is not permitted. Shags and other birds taking fish in some of the reservoirs are shot by the caretakers."

The proposal to form a sanctuary for kangaroos and emus in the Flinders Range, between Wirrabara and Port Germein, was being considered. The delay was caused by a fire having occurred in the Wirrabara country.

The complaint about the massacre of 80 seals on Pearson's Isles turned out to refer to an old occurrence, and not a fresh slaughter, as was at first thought.

A protest was made by the Committee to the Commonwealth Minister of Customs against the shipment of Australian birds by the "Medic," and a reply was received that that particular shipment had been allowed because it was in fulfilment of orders received before the 29th March last, and the specimens were collected before that date. In answer to that, a request was made to the Minister to prohibit the export of Australian birds for the future.

Enquiry was made by the District Clerk of Minlaton as to the possibility of successfully introducing kookaburras in a reserve in that town, which has some big trees and is about half a mile long and a street wide. The members doubted the success of such an effort on account of the smallness of the area.

A proposal to form a sanctuary (eight miles from Mount Gambier) of the Forest Reserve of 8,000 acres, to which a further 4,000 acres should be added by purchase, is still in abeyance. The State Minister is favourable to the project, but the purchase of the additional 4,000 acres requires to be passed by Parliament. The whole land is of a scrubby nature, with sheoaks and bracken thereon.

It was reported that Messrs. Pearce Bros. and Yelland and Bowman (of Campbell House) had made their lands on Lake Alexandrina, which extend from Reedy Point to Point Sturt and to Hindmarsh Island, in all about twenty miles, sanctuaries as regards the bird life thereon.

In response to a request from the Customs and Excise Office, Captain S. A. White was nominated for appointment on the Advisory Committee for this State re the Exportation of birds and animals, with Mr. W. Champion Hackett to act in the nominee's absence.

Flinders Chase. The Chairman reported that the Government had purchased the Rocky River Station and added it to the Chase, and that Mr. May had been engaged to act as Ranger on the Chase.

S. A. WHITE, Chairman.

J. SUTTON, Hon. Secretary.

September 19, 1923.

REVIEWS.

"*An Elementary Text-book of Australian Forest Botany*," Vol. I., by T. C. White, F.L.S. (Government Botanist of Queensland). Published by the New South Wales Forest Commission, 25 O'Connell Street, Sydney. Price 7/6. To be completed in two volumes.

A special note of this publication is the large number of illustrations, mainly from photographs or drawings of actual specimens of Australian forest plants. The technical terms of botany are very fully illustrated, and the terms themselves are clearly explained as they occur in the text, an excellent idea. To the student of botany, or to any person interested in the trees of Australia, this book may be strongly recommended. The present volume forms a complete introduction to the study of Australian forest plants.

"*A Census of the Plants of Victoria*, with their Regional Distribution and the Vernacular Names as Adopted by the Plant Names Committee of the Field Naturalists' Club of Victoria." Published by the Field Naturalists' Club of Victoria.

(Review held over for next number.)

EXCHANGES.

"The Queensland Naturalist" for March and September, 1923. One article deals with "The Photographer Naturalist."

A number of reprints forwarded by the National Herbarium of Victoria: (1) "Timber Production and Growth Curves of Mountain Ash (*Eucalyptus regnans*)", R. T. Paton. (2 and 3) "Contributions from the National Herbarium of Victoria," J. R. Tovey and P. F. Morris. (4) "A Naturalist at Mount Rosea (Grampians)", J. W. Audas. (5) "A Valuable Legume," J. W. Audas.

From the Field Naturalists' Club of Victoria, "A Circuit of the Grampians," J. W. Audas.

"The Victorian Naturalist" for September and October. "The Bunyip," by E. J. Dunn, F.G.S., who professes to have seen the fearsome beast, and "A Trip to the Bogong Height Plains," by H. B. Williamson, F.L.S., are two of the many instructive articles.

"The South Australian Ornithologist" for July.

"The Australian Naturalist" (N.S.W.), for July and October.

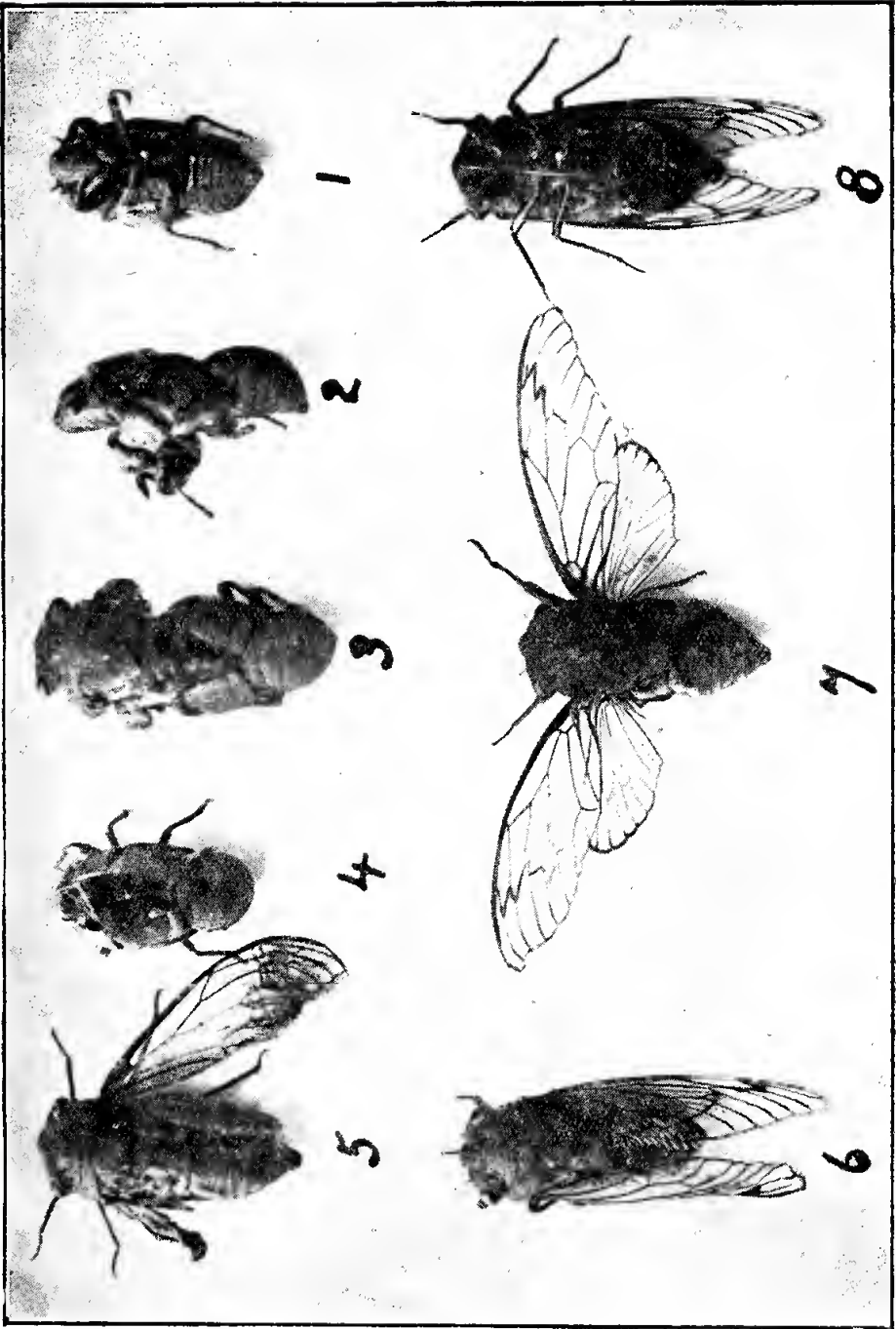
Journal of the Arnold Arboretum, Mass., U.S.A., Vol. iv., No. 3, July, 1923.

SUMMER AND THE CICADA.

(By T. W. Nettelbeck.)

Who of us, in our ramblings through the hills on hot summer days, has not heard the monotonous music of the Cicada, and looked up into the lofty branches searching for the noisy musician of the towering eucalypt? I am sure the Nature-lover would feel that something was missing among the trees if he or she had not heard that busy songster during an exploration in the hills on a summer day. One may frequently hear a person remark, "Oh! listen to the locusts!" But our little friend, in truth, has little in common with a locust, as he is not a gnawing or biting insect in the adult stage, but, on the contrary, a sucking insect, and so busy is he getting his nectar from the tree that he does not stop to sing between drinks. Dame Nature has provided a special musical apparatus beneath the abdomen of the male only, which is operated by a separate set of muscles, and produces that continuous drone with which we are all so familiar. The female, though dumb, is not less busy; she has been provided with a chisel-like instrument, which is fixed in the top of the abdomen. With this she can penetrate the soft surface of the bark, and, when the incision is made, the eggs are laid in in little batches. Soon the small white grub emerges from the egg, and makes its way to the ground, where it lives on roots until it changes to the pupal stage. It is provided with strong burrowing claws and a good horny covering to fit it for its work underground, where it lives till spring. It usually emerges from the ground during the early hours of the morning, while the surface of the earth is soft from the dew. Crawling up the nearest twig or tree trunk, it dries itself, and the outer covering splits down the centre of the back, and through this crack the insect crawls slowly and unsteadily until it is quite out.

Its wings have yet to spread out and dry, as they are still wet and have a very pretty appearance like a little bundle of tinted gossamer; but in a couple of hours they are completely grown and beautifully veined strong wings, and away flies the happy cicada to join its fellows in the trees. I can never forget an incident which occurred while I was collecting in the scrub in New South Wales. I came across an old, care-free swagman who, after learning that I was an insect hunter, looked at me as though I was a kind of harmless lunatic; the cicadas were singing overhead, and he asked me about them. After my simple explanation of their ways, etc., he said: "No



wonder he sings all the time when he has all he wants to drink and a wife who can't talk." It was not a fair remark, I thought, as I moved on trying to recall where I had read how the Greck poet Plato had praised the little insect's song.

The accompanying plate shows the cicada emerging from the pupal covering.

- (1) Underside of pupa.
 - (1) Underside of pupa, showing the strong forelegs.
 - (2) The insect emerging, showing the strong forelegs.
 - (3) Back view of insect emerging.
 - (4) Empty pupal case.
 - (5) Newly-emerged insect, with wings partly developed.
 - (6) Showing how wings sometimes develop one at a time.
 - (7) Perfect insect.
 - (7) Underside, showing musical apparatus and sucking tube.
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GEOGRAPHICAL DISTRIBUTION OF NATIVE PLANTS IN SOUTH AUSTRALIA.

List of Keepers, Assistants, and Orders.

1. **Prof. J. B. Cleland.** Miss M. L. Benda, Miss F. Watson, Mr. A. J. Morison. Orders, Nos. 1 to 12 and 83.

2. **Prof. T. G. B. Osborn.** Mr. and Mrs. Elliott and Misses E. D. Macklin and Illingworth. Orders, Nos. 13 to 22 and 41 to 47.

3. **Mr. W. Ham.** Miss E. Hocking, Mr. A. G. Edquist. Orders, Nos. 23 to 31 and 33 to 40.

4. **Mr. J. F. Bailey.** Miss Roeger and Mr. W. H. Selway. Orders, Nos. 48 to 60.

5. **Mr. W. C. Hackett.** Mr. and Mrs. Pearce, Miss L. Macklin. Orders, Nos. 61 to 75.

6. **Mr. J. A. Hogan.** Miss C. A. Benda and Mr. Stokes. Orders, Nos. 76 to 89 (except 83).

7. **Miss D. Featherstone.** Miss Isabel Hackett, and Miss Croker. Orders, Nos. 90 to 106.

8. **Mr. E. H. Ising.** Misses A. and E. Simpson and Mr. Waddy. Orders, Nos. 32 and 107 to 117.

The above order numbers are taken from Mr. Black's new "Flora of South Australia," Part I.

GEOGRAPHICAL DISTRIBUTION OF NATIVE PLANTS OR PLANT SURVEY OF SOUTH AUSTRALIA.

Donations to the Herbarium.

The collection of plants presented by Mr. A. H. Elston and the prize collections of Mount Barker High School and Yorke Valley Public School, together with those mentioned below, will form the nucleus of our Herbarium. The following have made donations of plants:

1. Mr. B. Hand (Streaky Bay).
2. Mr. William Ham (Iron Knob).
3. Prof. J. B. Cleland (various places).
4. E. H. Ising (Ooldea, etc.).
5. Miss E. Leahy, Wisanger, K.I.

Promises of collections have been received from Mount Barker, Renmark, Yorke Valley, and Inman Valley.

E.H.I.

THE FORTIETH ANNUAL REPORT OF THE FIELD NATURALISTS' SECTION OF THE ROYAL SOCIETY OF S.A. (INCORPORATED). For Year ended September 24, 1923.

General.

The Committee have pleasure in presenting the fortieth annual report.

Membership.

Last year the membership was 183, and depletion of our ranks by death and resignations during the twelve months amounted to 27. New members elected total 29, thus making the present total 185.

Obituary.

We are sorry to have to record the death of Mr. J. G. Ashton, who was one of our earliest members and who took a keen interest in natural history subjects.

Lectures.

We are greatly indebted to the lecturers, upon whom we depend for maintaining interest in the Section. Lectures were given as follows:—

"Botany for Beginners," by Mr. J. M. Black; "Our Wattles," by Mr. A. J. Campbell; "Aquatic Life," by Mr. H. M. Hale; "Rock Study," by Sir Douglas Mawson, D.Sc.; "Nature Photography," by Messrs. B. Beck, A. J. Morison,

J. F. Bailey, H. M. Hale, P. H. Williams, E. A. S. Thomas, W. H. Selway, W. Rosser, and E. H. Ising; "Flora and Fauna of the Trip to Darwin by Motor," by Captain S. A. White, C.M. B.O.U.; "Tasmanian Scenery," by Dr. R. H. Pulleine; "Native Stone Implements," by Dr. A. M. Morgan; "Univalve Molluscs," by W. J. Kimber; "Fungi Specimens," by Prof. J. B. Cleland, M.D.; "Life History of some Parasites," by Prof. T. Harvey Johnston, M.A., D.Sc.; "A Trip to Groote Eylandt, Gulf of Carpentaria," by Mr. N. B. Tindale.

Excursions.

The leaders of the excursions have done good service to the Section, the subjects having been as follows:—Botany, Gum Trees, Swamp (Tidal) Flora, Ornithology, Sheoaks, Physiography, Fungi, Conchology, Shore Life, Entomology, Dredging. The trips have been made by train, tram, and char-a-banc, the latter giving opportunity for getting away from the metropolis.

Flower Show, 1922.

The annual Flower Show was held on October 13 and 14 in the Institute Building, and proved to be a successful fixture. The Public Schools contributed largely to its success, and kindred societies in the other States sent splendid exhibits. The credit balance amounted to £16 18s. 5d.

Exhibits.

A number of exhibits have been shown by members, and the Committee hopes that this subject will receive greater prominence in the coming year.

Geographical Distribution of Native Plants in S.A.

A sub-committee was formed recently, and it is the object of the members to conduct a "Plant Survey of S.A." To carry this out it will be necessary to get plant specimens; it is hoped that members going on holidays in the country will collect plants, and that all who have friends in any part of the State will enlist their help in obtaining and forwarding specimens. By this means a Field Naturalists' Herbarium will be formed, eight keepers and several assistants having been appointed to take charge of it. Much assistance is being given by Professor T. G. B. Osborn, D.Sc., and Professor J. B. Cleland, M.D. It is proposed to amalgamate the Vernacular Plant Names Committee with the above.

"The South Australian Naturalist."

Our Journal has been published quarterly, as usual, and the Editor, Mr. Wm. Ham, F.R.E.S., has maintained the quality of articles of the standard set by the first Editor, Dr. C. Fenner, F.G.S. Original articles have been contributed by Messrs. Edgar R. Waite, F.L.S., A. M. Lea, F.E.S., E. H. Ising, Wm. Ham, F.R.E.S., A. J. Morison, Prof. J. B. Cleland, M.D., H. M. Hale, and W. J. Hosking. The issue last month, August, 1923, completed the fourth volume.

Exchanges.

"The Victorian Naturalist," "The Australian Naturalist" (Sydney), "The Queensland Naturalist," "The Geelong Naturalist," "The S.A. Ornithologist," "Transactions of the Royal Society of S.A.," "Illustrated Catalogue of the Fishes of South Australia," National Herbarium of Victoria, Smithsonian Institution (Washington, D.C., U.S.A.).

Newspaper Reports.

We are much indebted to the daily newspapers for the splendid reports of our meetings and excursions.

Exportation of Native Fauna.

Professor J. B. Cleland was elected by the Section on an Advisory Committee formed in Adelaide to consult with the Officers of the Commonwealth Government in regard to this matter. Mr. Edwin Ashby was appointed deputy.

WM. HAM, Chairman.

ERNEST H. ISING, Hon. Secretary.

September 25, 1923.

THE CALL OF THE WILD.

"A striking feature of the field naturalists is their indifference to the weather conditions. Blustering wind and driving rainsqualls do not suffice to quench their ardour or to detain them indoors. On October 10 the weather provided a reasonable excuse for default in making an appearance, and yet more than fifty members, half being of the fair sex, plucked up courage to face the fierce gales and the bitter hailstorms in an expedition to one of the bleakest and wettest parts of our hills. The exhilarating purity of the bracing air of the hills acted as a tonic to raise the spirits of the party to a pitch of enthusiasm, despite the extreme inclemency of the weather. The absence of formality, the *al fresco* meal, the jolly good-

fellowship, seem to arouse that elemental feeling of oneness with the birds and flowers which, in spite of the veneer of civilisation, lies dormant in the subconscious mind. The delicate tints, the dainty forms of the wild flowers, the scent of the ferns and of the virgin soil, the stately outline of the eucalypti, the bright gold and faint odours of the wattle, the twittering of the small birds, the liquid gurgle of the magpie, and the plaintive cry of the harmonious thrush, transported the city dwellers into an earthly paradise. Added to this, the passion for research and the joy of discovery animated the eager investigators in their several departments. The entomologist enters the dense scrub, vigorously shaking every tree and every bush, seeking for spoil to fill his little phials; the botanist revels in the glory of Nature's garden, and with satchel and trowel prepares to convey his booty to a convenient place for more careful examination; the geologist, from a neighbouring hill, surveys hill and valley, and ponders on composition of the rock, and with his hammer chips off fragments and calculates the lay of the strata and the dip of the reef; the ornithologist marks the flight and listens to the song by which he identifies the bird."

"AGAPAETUS" in "The Saturday Journal."

LECTURES AND EXCURSIONS.

Excursion to Slape's Gully, August 18, 1923.—Mr. W. H. Selway led a large party of members. It was rather early for native flowers, but two species of greenhood (*Pterostylis nana* and *P. reflexa*) were noticed and one species of helmet orchid (*Corysanthes fimbriata*). The walk through the Gully included some of the most charming scenery of the hills.

Lecture, "A Trip to Groote Eylandt, Gulf of Carpentaria."
Mr. Norman B. Tindale, August 21, 1923.—Mr. Tindale interested a large audience with an account of his collecting trip to this hitherto unknown island. The lecturer's remarks were illustrated by a fine series of slides, and by a selection of native weapons, ornaments, fishing traps, and cases of insects collected by the lecturer, who had been able to take no less than 500 ethnological specimens, 150 birds and 9,600 insects, in addition to many mammals, shells, and botanical specimens.

Excursion to Morialta, September 1, 1923.—A party of members, under the guidance of Mr. Hogan, visited Morialta, and greatly enjoyed the splendid scenery of the gorge and the beauty of the waterfalls. The well-planned planting of native trees, under the guidance of Mr. Hogan, is greatly enhancing the rugged beauty of this picturesque valley.

Excursion to the Park Lands and City Nursery, September 8, 1923.—Under the leadership of Mr. A. J. Morison and the City Gardener, Mr. A. W. Pelzer, a large party inspected a part of Adelaide's 2,000 acres of park lands. About 80 species of trees are grown in the parks and city streets. The merits and disadvantages of various trees were keenly discussed. There was general agreement that the city and its parks had been greatly beautified by the planting already accomplished, and that there still remained a great scope for increase in the numbers of the trees, both in the streets and in the parks. A visit to the City Nursery gave members a better idea of the work entailed in keeping up and extending the gardens, playgrounds, and plantations so skilfully managed by the City Gardener.

Excursion to Hope Valley, September 29, 1923.—A party of members, under the guidance of Prof. J. B. Cleland, visited this delightful spot, and found quite a wealth of native flowers as yet untouched by the destroyer's hand. A very enjoyable afternoon was spent, and the botanists of the party were able to collect quite a large variety of specimens.

Excursion to the Grange, October 6, 1923.—A visit to the Grange proved prolific of interesting material. The leader was Mr. A. G. Edquist. The favourite haunts of the aborigines, before the advent of the white man, the sandhills still retain many traces of their ancient occupation in the form of burned clay (marking the old fireplaces), chipped stones, and shaped quartzite scrapers, hammer stones, etc. Some of the party dredged the pools for living pond animals, of which many interesting forms were taken. The leader spoke on pond life in general and the life history of some of the more common forms.

Excursion to Warren Reservoir, October 10, 1923.—The visit to Warren Reservoir on Eight Hours Day, under the leadership of Professor T. G. B. Osborn, D.Sc., was unfortunately marred by the boisterous weather. The route via Millbrook and Kersbrook led through some of the finest scenery of the hills. From the time of arrival at the Reservoir the almost constant rain prevented much collecting by the botanists of the party, and not many species were taken.

Lecture on "Clouds" by Mr. A. G. Edquist, October 16, 1923.—The lecturer dealt in a chatty manner with the formation and varieties of clouds, with special reference to South Australian weather conditions. Experiments, blackboard sketches, and some fine photographs served to make the speaker's remarks more graphic. At the conclusion of the lecture numerous questions were asked and answered. Several members also brought specimens, which were discussed.

Excursion to Fulham, October 20, 1923.—The afternoon proved fine, and a large number availed themselves of Captain S. A. White's kind invitation to visit his home. A great number of birds had been set out for examination in cases, and the members inspected these as well as the curios brought by Captain White from Central Australia. In his remarks the lecturer spoke on the most important of the useful birds of Australia.

Excursion to Millbrook, October 27, 1923.—The trip to Millbrook was taken in ideal weather, and members were charmed with the picturesque view of Millbrook, with its winding shores, presenting as it does the appearance rather of a mountain lake than of an artificial reservoir. By the kindness of the Waterworks Department the Section was allowed to visit the reserve, where Mr. Oliver welcomed the party. The flora was abundant, orchids in particular being well represented. Various species of *Thelymitra* were particularly numerous, especially the beautifully scented yellow *Thelymitra antennifera*. *Thelymitra longifolia* was also found. Other species found included *Glossodia major*, *Caladenia latifolia*, *Diuris* sp., *Microtis porrifolia*, *Caladenia patersoni*. *Tetratheca* was growing in abundance, and some specimens of the native iris, *Patersonia* sp., were also found. The view from a boat in the middle of the lake was particularly fine. The reservoir, with a capacity of over 3,650 million gallons, was full, covering about 480 acres.

Visit to the Botanic Garden, November 3, 1923.—Under the guidance of the Director of the Garden, Mr. J. F. Bailey, a large party visited the Botanic Garden and Park on Saturday, November 3. The rockery round the Palm House was greatly admired. The many beautiful trees from various parts of the world show that our climate is specially favourable to the growth of trees. Among the finest trees seen were the Kauri pine of New Zealand, the Bunya Bunya of Queensland, the Jacaranda of Brazil, the Kurrajong, or flame tree, the camphor laurel of China, and many varieties of pine, palm, and fig. The roseries were in full bloom, and about a thousand

varieties were seen in flower. A visit to the native plant section showed what a fine work Mr. Bailey is doing in the cultivation of our native flora.

Visit to Mr. A. K. Newbery's garden at Mount Lofty, November 10, 1923.—A large party travelled to Mount Lofty, and were shown through the beautiful garden and hospitably entertained by Mr. Newbery. In the absence of the President, Mr. A. J. Morison acted as leader.

SOUTH AUSTRALIAN AQUARIUM SOCIETY.

The sixth annual meeting of the South Australian Aquarium Society was held on November 6 at Mr. J. W. Hosking's rooms, Norwood. The following officers were elected for the ensuing year: President, Mr. B. B. Beck; Vice-President, Mr. S. S. Stokes; Committee, Miss M. Roeger, and Messrs. J. W. Hosking, J. Boase, and R. Carpenter; Auditor, Mr. A. E. Wadey; Hon. Secretary and Treasurer, Mr. H. M. Hale; Assistant Secretary, Mr. J. W. Goodale.

It was resolved that the Field Naturalists' Section be asked to print records of meetings of the Society and papers by members.

Appreciation was expressed of Mr. and Mrs. Hosking's continued kindness in providing a room in which the meetings of the Society are held. Mr. Reg T. Foster was also thanked for the excellent arrangements made by him for the annual camp at Murray Bridge, at which he has for five years acted

HERBERT M. HALE, Hon. Secretary.

HELD OVER.

Librarian's Report, and review of "A Census of the Victorian Flora, with Vernacular Names."

The South Australian Naturalist

The Journal of the Field Naturalists' Section of the Royal Society of South Australia.

Adelaide



Feb., 1924

VOL. V

No. 2

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Each writer is responsible for the individual opinions expressed and the facts submitted.

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Hon. Auditors—Messrs. W. D. Reed, F.C.P.A., and A. J. Morison.

“The South Australian Naturalist”—Editor, Mr. Wm. Ham, F.R.E.S. Address: The University, Adelaide.

FORTHCOMING EXCURSIONS.

- March 1.—Modbury. Visit Mr. R. A. Smith. Charabanc, 1.30 p.m., Adelaide Town Hall. Leader, Mr. A. J. Wiley.
- March 15.—Dredging. Train to Outer Harbour, 1.35 p.m. Leaders, Prof. Harvey Johnston, Messrs. Kimber and Hale.
- March 21.—Evening visit to Mr. Farrow's, Semaphore. Astronomy. Party limited to 10. Train at 7.5 p.m.
- March 29.—Burnside. Tram at 2 p.m. Visit Mr. A. A. Simpson, C.M.G. Leader, Mr. A. J. Morison.
- April 5.—Henley to Glenelg. Tram at 2 o'clock opposite Bank of Adelaide. Leaders, Messrs. Kimber and Ham. Shore life and sandhill botany, etc.
- April 21 (Easter Monday).—Hallett's Cove. Train, 9.10 a.m. Leader, Dr. Fenner, F.G.S. Physiography and Glacial Remains.
- April 25 (Anzac Day Holiday).—Kinchina. Train, 7.35 a.m. Leader, Mr. J. Sutton. Bird-life, etc.
- May 10.—Long Gully to Belair. Train, 2.3 p.m. Leaders, Prof. J. B. Cleland and Photographers. Botany, etc.
- May 24.—Stonyfell and Gandy's Gully. Burnside tram, Pirie Street, 2 p.m. Leader, Mr. Hogan. Botany.

EVENING LECTURES.

- March 18.—Exhibits Evening. Members are invited to bring any natural history exhibits. Mrs. C. Pearce, “American Scenes,” etc. Prof. T. Harvey Johnston, “Parasites.”
- April 15.—“Glaciations of the Past, with special reference to Australasia.” Mr. L. Keith Ward, B.A., B.E.
- May 20.—Lecturettes: Dr. C. Fenner, F.G.S., and Mr. W. J. Kimber. Also Exhibits.

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South Australian Naturalist

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No. 2.

ITEMS OF INTEREST TO THE F.N.S.

The Committee met very early this year to consider the programme of excursions. Owing to the financial loss entailed on the section by a number of the char-a-banc trips in 1923, the task was one of more than usual difficulty. After discussion and deliberation the Committee decided that during 1924 the Section should devote a good share of the time to a more thorough examination and detailed description of public reserves near the city, particularly those at Morialta, Waterfall Gully, and National Park, Belair. It is proposed that investigation be undertaken and papers compiled and published (probably in the first instance in the pages of our Magazine) dealing with the geology, physiography, botany, insecta, mammalia, and fungi of these reserves.

There will be work for all members in observing, recording, and preserving specimens. It is hoped to secure practical help from the Board controlling the reserves, as well as from the Tourist Bureau, the Railway Department, and other bodies interested.

The Committee are anxious that all members should do what they can to impress the public with the need for securing such suitable areas as that referred to by the Chairman in his article on another page of this number.

The natural beauty of this area, its accessibility, the value of the young stringy bark forest already established on it, as well as the extremely cheap rate at which it can be secured, are only a few of the arguments in favour of securing this spot as a public reserve. As an investment, it is financially "gilt-edged." It only needs to be known. Every field naturalist should be a publicity agent.

The dredging trip on February 2 proved so enjoyable that the Committee has arranged for another trip on **March 15**. With fine weather, it should prove just as interesting and fruitful.

Volume XLVII. of the Proceedings of the parent Society, just issued in an enlarged form, proves one of the most interesting volumes yet published. Members of our Section are well represented in the list of authors. Our Chairman (Dr. J. B. Cleland) collaborates in an article on Australian Fungi, illustrated by two excellently-produced colour plates. Professors Wood-Jones, T. Harvey Johnston, T. G. B. Osborn, and Messrs. Lea, Lower, Elston, Ashby, Wood, Black, Waite, Tindale, and Dr. Rogers all appear as contributors to this fine volume.

Members are earnestly requested to book early for the charabanc trip on March 1st.

DREDGING EXCURSION, FEBRUARY 2nd, 1924.

The weather proved almost ideally calm for the trip, and the party were able to go out into the Gulf for about six miles. Many hauls were made during the afternoon, generally on a weedy bottom, the dredgings bringing up no sand and but little true seaweed. Sponges were especially common, and a great many Echinoderms were taken, as well as crabs and a variety of Crustaceans. Various members of the party collected specimens of the various families, Mr. Hale collecting the crustaceans, Mr. Kimber shells, Prof. Harvey Johnston sponges, polyzoa, and worms.

Prof. H. Johnston, in addressing the members, spoke on some of the material collected that afternoon. Dealing first with the sponges, he referred to the part played by the spicules. Specimens of polyps were made the occasion for short references to the formation of colonies of animals. Then came the Polyzoa, with colonies of independent individuals. Some of the worms caught were next described, most living in tubes made of sand, shells, and other material, still others living in the flesh of sponges. Of these latter, there were many specimens taken. The larval stage of the worms was described as being closely akin to that of the mollusca, though their subsequent development was so different. The sea squirts, or Ascidians, were briefly described, and their retrogression from the promise of their larval stage, with notochord and free movement, to the final "baglike" stage, when the animal is a mere little stomach with two openings, having lost its incipient backbone, along with all power of locomotion.

Mr. Kimber spoke on the shells taken. A note by Mr. H. M. Hale on the various crustaceans follows.

A REMARKABLE CRUSTACEAN.

Herbert M. Hale, South Australian Museum.

During the dredging trip on February 2nd a quantity of small forms of Crustacea came up in the dredge. Amongst these were some examples of **Gnathia**, an Isopod not hitherto recorded from our State. The members of this genus rarely exceed 8 mm. in length. They have a fascinating life history and are remarkable for an extraordinary dimorphism between the sexes. The tiny early larva of the animal is parasitic in habit and obtains its meals from fishes, to which it fastens itself until satisfied. After a time the larva becomes very swollen, the gut being filled with, and greatly distended by, the juices sucked from the fish. After leaving its host for the last time, the larva moults and continues the life cycle as adult male or female, in which stage it never feeds again, subsisting solely upon the stored food in the gut. While the larvae are much alike the adults present remarkable sexual differences. The female somewhat resembles the larva, but becomes still more swollen; the stored nourishment is absorbed by the ovary and all the other organs degenerate to make room for a mass of large eggs which occupy the whole body cavity. The female then, becomes merely a living egg-sac from which the young **Gnathiae** hatch out. The male, however, assumes an astonishing form. The head is large and massive, and furnished with a pair of grasping mandibles, the use of which is not definitely known; the head of the female is small. The body is segmented, comparatively narrow, and of quite different appearance from that of the female. In the male, the food ingested during larval life is assimilated and stored in the large liver.

EVENING LECTURES.

Photo. Evening, November 20, 1923.

Mr. Horswill showed a large number of original photographs of Tasmanian scenery, including fine pictures of snow scenes on Mount Wellington. Other members also exhibited a number of interesting pictures of natural history subjects.

The exhibitors included Messrs. Thomas, Wallis, Ham, and Ising, Mrs. Pearce, and Misses Correll and I. Roberts.

A PROPOSAL FOR A NATIONAL RESERVE AT MOUNT LOFTY.

By J. B. Cleland.

When from the plains of Adelaide we view the summit of Mount Lofty, and then let our gaze descend, we see tier succeeding tier till the foothills are reached. May I ask you to pause for a moment as you make this survey to consider a small plateau, covered with trees and at one time with a noble forest, whose position you may be able to recognize a little way below the summit and in direct line therewith. Its exact situation may be described as being about a mile in the direction of Adelaide itself from the road that passes round in front of Mount Lofty near its summit and as being bounded on the north by the deep gully that runs up on the right-hand side of the Green Hill Road, bending suddenly in its upper part to terminate between Mount Lofty itself and the Little Mount, and on the south by the rugged termination of the left-hand branch of the Waterfall Gully far beyond the Upper Falls. Indenting the plateau on the north-west aspect and partly draining it, is the termination of another small gully, sometimes called Woolshed Gully from an old woolshed at its entrance, whose creek falls into the Waterfall Gully Creek a little way below the hotel.

This plateau can be approached at present by timber-tracks, either by traveling down the ridge to it from the junction of Little Mount Lofty ridge with the main Mount, or by ascending Woolshed Gully. A bridle track also leads up the Woolshed Hill. When the plateau is reached, it is found that the grass-covered shale of the lower hills is suddenly replaced by the sandier soil and quartzite formation of the higher parts with its correspondingly richer natural Australian flora. In places the transition between the two types of soil is extraordinarily abrupt and one can almost straddle across the line of division, one foot being placed where stringy-barks (*Eucalyptus obliqua*), heaths and the grass-tree (*Xanthorrhoea semiplana*) flourish, the other being on the grass beneath *Eucalyptus viminalis* or *E. leucorylon*. The area itself is somewhat undulating or irregular and several creeklets have their origin in the depressions. The chief tree is the stringy-bark, *E. obliqua*, with a few examples of *E. capitellata*: *E. cosmophylla*, of mallee-habit with masses of large yellow flowers and large capsules, grows in places. At one time, the area was a dense forest with huge and ancient trees. Many years ago portion was cleared and the stumps grubbed up. Most of the debris was

burnt, but one old prostrate trunk defied all attempts at destruction and may be seen to-day with its diameter of somewhere near six feet near the base, in much the same condition as the writer remembers it when he camped as a boy in a hut on this site over 30 years ago. A vineyard was planted in the cleared area but the vines did not prosper and eventually died out. A regrowth of stringy-barks from seed followed and already this new generation of trees has succumbed to the woodman's axe and again the regrowth has started. *Sic transit gloria mundi*. Though the forest has been in part greatly injured, compared with its pristine state, its recovery from the repeated onslaughts on it has been wonderful, and a few years of fostering care would again see stately Eucalypts, with barrels straight as "the mast of some tall admiral" towering upwards to reach the light. Here we have, within easy access of the city, a relatively flat plateau, with magnificent views over the plains, partly covered with forest at present and only asking for a few years' rest to enable the weary city-dweller to lose himself amongst its umbrageous shade or rest in the cool beneath its leafy expanse. The trees that will grow upon it are timber-trees of considerable value, and would form some reserve for the years of timber famine that ere long will surely overtake us—will in fact overtake the present generation.

In 1922, the Field Naturalists' Section paid a visit to this spot, leaving the char-a-banc at the foot of the Summit and walking down the ridge. Then we discussed the beauties of the position, the necessity for obtaining more reserves within easy access of the city and the need for conserving and fostering our forest trees. Time has accentuated those needs and it seems now fitting that we as a body should join with others in pressing that this place be set aside as a reserve. The city is growing, hill-resorts are far too few and too small to meet even the present needs of our citizens, everyone who looks but a few years ahead sees a timber famine staring us in the face. Moreover, the suggestion has been made to me that we could have no more fitting memorial to the part our men played in the Great War than a National Reserve situated as this is, overlooking the plains from near the summit of our highest peak. Through the area passes the new cable for the supply of electric light to Mount Lofty. Why not, from this National Reserve, have a Beacon Light blazing forth every night, visible to all on the plains beneath? It might even be possible to arrange five lights to shine in the form of a Southern Cross to be lighted on special occasions, such as Anzac Day. The hills immediately below the proposed Reserve are naturally bare of trees and on one side a broad spur has, I should judge, a sufficiently level space to allow

of an aeroplane landing. Flight is coming nearer and nearer as a rapid and usual means of progression, and here we have a landing site on our hills whither on Saturdays and holidays visitors could be rapidly translated from town. Without interfering materially with the natural growth as a reserve, the Tourist Bureau could erect a residential house where people could stay for week-ends or during their holidays. A golf course could be established on the grassy lower hills as an additional attraction.

Surely, with so many interests all calling for this as a Reserve and with only a comparatively small sum required to hold the land from further despoiling of its natural beauties, we shall be able to secure it and hand it on to the generations to come, to them a priceless heirloom.

THE FORESTS OF MOUNT LOFTY RANGE.

By Ernest H. Ising.

South Australia has a wonderful heritage in the forests which clothe the Ranges. The beauty of the wooded hills and gullies is well known, not only to visiting Australians, but also to tourists from all parts of the world. The authorities would do well to preserve the beauty and wealth of the forests, which means a tangible asset to the State. The forests are for the use of the State and destruction of them should not be tolerated. It is our duty to see that sufficient timber supplies are passed on to posterity. It is an unfortunate fact that our State is not so blessed with forests as are the other parts of Australia, and this should lead to a sustained and vigorous forestry policy in this State until the industry has been placed in a safe and sound position.

Forests have other functions than that of supplying timber and firewood. It has been scientifically proved in other countries, Switzerland in particular, that a forest ensures a permanent supply of pure water. It has been shown that lack of timber-covered areas has been the cause of floods in the wet season, with consequent loss of good soil, and silting up of lakes and flats, and a drought in the summer or dry season. This has been demonstrated in a small way in the watershed of our Torrens River, and the silting up of our low-lying land along the foreshore near Henley. The timber around the source of the Torrens has been removed, and the bare hills now let the rainwater flow into the Torrens in a flood; with forests present

the rain would reach the main channel much more slowly, and thus allow the run-off to extend over a longer period. Forests, then, ensure a regular flow of good water throughout the year, and this water is generally clear and pure. This is of economic importance, as there is not the same need for water storage when the supply is permanent or regular.

Then the influence on climate or rainfall is an important factor to be considered. Forests act as a cooling and condensing agent to the upper atmosphere, bringing about the precipitation which would be impossible or unlikely with a barren landscape. The shade and shelter given by trees is for the benefit of man and his animals. Other points, such as the incomparable beauty of forest, with its association of bird, animal, and floral life, could be dealt with to show the value of forest growth, but I wish to mention some of our timbers which are of commercial value.

The classification of the Eucalypts (I will only deal with this genus, as it is practically our only timber-producing family) by means of their barks, as described by Mr. Maiden in his work, "Critical Revision of the Genus Eucalyptus," Part 51, 1922, is as follows:—

1. LEIOPHLOIAE (smooth barks or gums, outer layers shedding).
2. HEMIPHLOIAE (half barks, persistent and wrinkled on trunk).
3. RHYTIPHLOIAE (rough barks).
4. PACHYPHLOIAE (stringybarks, fibrous).
5. SCHIZOPHLOIAE (ironbarks, deeply furrowed).
6. LEPIDOPHLOIAE (barks friable and lamellar or sealy).

In this classification our timber trees are represented by the following species:—

I. LEIOPHLOIAE. Smooth barks or Gums.

Trees more or less erect in habit but not shaft-like; pale timbers.

1. **Eucalyptus leucoxylon** F.v.M. "Yellow gum" (previously called "Blue gum"). This species grows to a fair-sized timber tree and is found in association with the red gum (*E. rostrata*), although it does not grow in such damp situations. It is a good tree for bees. Its flowers are large and give a good supply of excellent nectar.

2. **E. rubida** Deane and Maiden. "Candlebark." It is chiefly in the damp gullies that this tree is found and its distribution is wide in the hills within the 30-inch rainfall but its numbers are very small. This is the most beautiful gum of

our hills, its magnificent trunk standing erect, pillar-like or columnar. Its bark, candle-white on the trunk, is the admiration of all who see it. Its leaves, buds and flowers are very similar to those of *E. viminalis*.

3. *E. viminalis* Labill. "Manna Gum." Much more plentiful than the last-named species and a good timber tree. It is often called the "Ribbony Gum" on account of the bark peeling off in long ribbons. Bark smooth and mostly deciduous. There is a section of this species at 15 miles along the railway line from Adelaide to Mt. Lofty which I have written about in this journal (Vol. II, No. 3, p. 65.).

Red Timber—

4. *E. rostrata* Schlecht. "River Red gum." A fine timber tree whose quality of timber is known all over the world; it is hard and durable and is used for many purposes where great strength is required. The distribution of this species in our State is very wide and it is found in almost all damp situations and watercourses throughout the Mt. Lofty Range and along the Murray. The bark is smooth and is shed in patches so that the trunk has a mottled appearance in grey and green colours.

Tree of a scrambling habit, timber dark—

5. *E. cosmophylla* F.v.M. "Cabbage gum." This is not a timber species as the trees do not grow to any size and are generally crooked. It does not grow in the other States. Mr. Maiden includes this among the smooth barks but I think it would be better in the rough bark section. (l.c. p. 28.).

6. *E. fasciculosa* F.v.M. "Pink Gum." This can hardly be called a timber species, but it is made use of for fencing posts, etc. It grows around Mt. Lofty among the stringybarks but is more plentiful in the drier mallee country on the Murray flats east of the range near Monarto.

II. HEMIPHLOIAE. Half-barks.

E. hemiphloia F.v.M. As it is doubtful whether this species grows in the Mt. Lofty Range it need not be considered here.

7. *E. ovata* Labill. "White or Sand Gum." Timber dark, very hard and durable. It is a comparatively rare species and seems to be confined to the Myponga district. The bark is rough and dark at the butt of the tree but is otherwise whitish and smooth.

III. RHYTIPHLOIAE. Rough barks.

8. *E. elaeophora* F.v.M. "Box gum." A species with a box bark, scaly and rough like our peppermint (*E. odorata*), growing at Humbug Scrub and Warren Reservoir district. It

is not a very large tree in those places but it is plentiful and useful for posts and firewood. It would make fine small timber although I do not know of its being used commercially.

9. **E. odorata** Behr and Schlecht. "Peppermint" or "Box." Plentiful along the foothills and to the north of Adelaide. Extends for a few miles into the hills where it is in almost a pure stand around Eden to Belair. In the Mitcham foothills it is a tree with a large main trunk, but it is chiefly of the mallee form elsewhere.

IV. PACHYPHLOIAE. Stringybarks.

10. **E. Blaxlandii** Maiden. (**E. capitellata** Sm.). "Brown stringybark." A timber used for many purposes but the tree is not of general distribution as it prefers the dry quartzite hilltops. It often grows to a big tree.

11. **E. obliqua** L'Herit. "White stringybark or Messmate." This is the main tree of our hills and is distributed over all situations within areas having a rainfall of 30 inches and upwards. It is not found in the outer fringe of hills but in the higher altitudes from about 1,200 feet above the sea level. It is used for furniture, timbers for all purposes, and firewood. It grows in dense stands and is most plentiful.

Sections V. and VI. are not represented in the Mt. Lofty Range.

Some of the headings to the Sections have been adapted from Mr. Maiden's work.

GEOGRAPHICAL DISTRIBUTION OF NATIVE PLANTS IN SOUTH AUSTRALIA.

Additions to Plant Survey Herbarium.

The following have sent parcels of specimens:—

1. Mr. L. Reese, Minnie Downs Station, near Birdsville (via Marree). Twenty-seven species collected in January.
2. Prof. J. B. Cleland. Collections from Kinehina and Encounter Bay.
3. Inman Valley School, Miss A. Adcock, head teacher. A collection from Inman Valley and Victor Harbor.
4. Moorlands Public School, Mr. L. Ford, head teacher. Collections made by two of the scholars.
5. Maitland Public School, collector Keith Bagshaw.
6. The Section has recently accepted the "Tepper Herbarium" from the Executors of the late Mr. J. G. O. Tepper, who was for many years one of its most active members. The herbarium is a valuable acquisition and it is intended to perpetuate Mr. Tepper's memory in connection with his plants. As soon as arrangements can be made to have the plants fumigated they will be placed in our Herbarium.

WILSON'S PROMONTORY, A NATIONAL PARK.

It may be of interest to our members who have been active in securing Flinders Chase, on Kangaroo Island, as a reserve for our native fauna and flora to read of the success of similar efforts in Victoria. The extracts are from an article published in the "Argus" of February 9:—

The idea of reserving Wilson's Promontory as a suitable place for a national park seems to have arisen about forty years ago. The Field Naturalists' Club of Victoria, with kindred societies, took action, urging its reservation. It was not until after much agitation and insistence on the proposition that in 1905 the promontory was permanently reserved as a national park. The park was constituted under trustees, representing interested societies, and the Lands Department. Now, a wire fence with parallel rows of barbed wire to a height of about 8 ft. has been built across the head of the promontory for about seven miles; native fauna introduced, wild dogs and dingoes destroyed, and every effort made to make the National Park a place of protection for our animals and plants, a source of pleasure and instruction to nature lovers, and a suitable resort for those who amid primitive surroundings seek health and exercise.

Kangaroos, wallabies, wombats, koalas, emus, opossums are among some of the fauna of the park. The lyrebird has been introduced, the eastern valleys being an ideal place for its habitat. Unfortunately foxes and rabbits have gained access, with what results it remains to be seen. At different times camping parties have visited the park, and visitors have been brought down by the members of the board controlling the park, a house having been built for the convenience, and at the disposal of the latter.

A new departure has now been made. The house has been transformed into a chalet for the accommodation of tourists, and for the first time this holiday season provision has been **made to receive** visitors at the chalet. It was fitting that the first organised party to avail themselves of such accommodation was a detachment of the members of the Field Naturalists' Club to the number of 16, the club in the past having effectively and continuously worked to secure the reservation of the area as a national park. Accommodation is necessarily limited, but very satisfactory. Bathing facilities in sea or stream are good. Walking exercise is abundant and varied, and riding horses obtainable if required. For a place where the "call of the wild" is insistently heard, where the bird-lover will have ample scope for observation, and nature-lovers may wander intent on the study of wild life or native flora, the National Park can be commended.

THE CRATERS AND LAKES OF MOUNT GAMBIER.

(In Volume XLV. of the Proceedings of the Royal Society of South Australia, a former Chairman of our Section, Dr. C. Fenner, F.G.S., published a comprehensive paper on Mount Gambier, in which he summarised the available literature and gave the results of prolonged investigation and scientific enquiry. Herewith we have pleasure in publishing a summary of the article, together with some figures, the blocks for which were kindly lent by the Royal Society.—Ed. "S.A.N.")

Though the geological features of the Mount Gambier volcanoes are on a relatively small scale, they have had a very great influence on the surrounding district from the economic point of view. The fertile soils of the ash deposits, together with the visible unlimited water supply of the lakes, led to early settlement in the district, and to the rise there of a well-built town, that has become the chief centre of the south-eastern districts of South Australia.

The history of the volcanic area having been so unusual and varied, the resulting scenery is equally notable for its variety, beauty, and unexpectedness. For this reason the town has become noted as a tourist resort. Practically the whole area of the Mount itself is reserved for public purposes—botanic, forest, or public park—and much has been done to add to the beauty by tree-planting and improvement, without destruction of the unique natural features.

The well-built nature of the town is largely due to the abundant supplies of good building stones (limestones and dolomites). The basalt (from Mount Schank) is used for road-making, and the ash forms excellent footpaths. The local water supply is drawn from the Blue Lake. But for the existence of the volcano, the area would doubtless consist to-day of a broad limestone plain, sparsely settled, and economically unimportant.

Mount Gambier is the best known of a series of small volcanic hills, which may be classified in three groups:—

(i) Mount Gambier, The Bluff, Mount Muirhead, and Mount Burr.

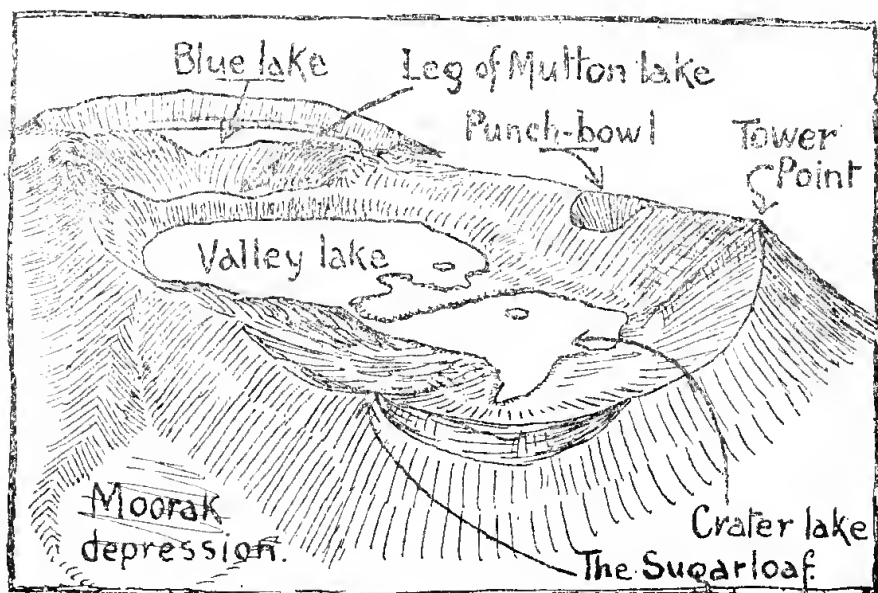
(2) Mount Edwards, Mount McIntyre, and Mount Graham.

(3) Mount Schank.

The bed-rock of the surrounding country consists of a series of marine tertiary limestones, which include red and cream-coloured dolomites and a ployzoal limestone (all three used as building stones), and, in places, flints are extremely

abundant. The value of these flints was appreciated by the aborigines, and not less so by the present inhabitants, for they are exported in considerable quantities.

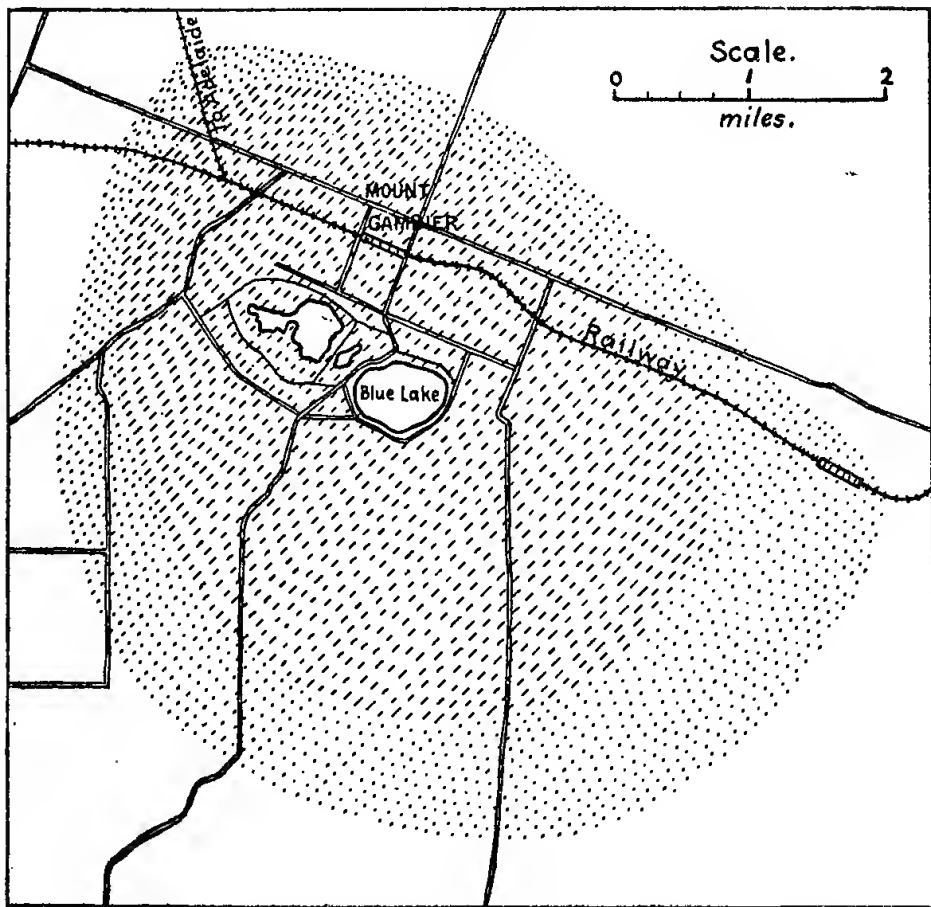
The surface of the underground water is about 70 ft. to 80 ft. above sea-level at Mount Gambier (140 ft. above sea-level), and is there exposed to view in a series of four beautiful lakes. The immediate neighbourhood of Mount Gambier might best be described by reference to the sketch given in fig. 1, which has been drawn in part from an aerial photograph taken by Mr. Arthur, of Mount Gambier, looking eastward.



The present-day Mount Gambier is but a remnant of what was at one time a considerable pile of volcanic material, mainly fragmentary. A series of extensive collapses took place along the line of the cones, so that the higher portions have almost wholly disappeared, and only the outer, lower slopes remain intact. The collapsed area is in part occupied by lakes, the surfaces of which are about 70 ft. below the level of the town, and the surrounding plain.

In the very early stages of the volcanic outburst there was a small flow of basaltic lava. This is exposed in section in the western and eastern walls of the Blue Lake, and in the eastern wall of the Valley Lake, with a thin deposit of volcanic ash separating it from the underlying limestone. This lava is known locally as the "blue rock," in contradistinction to the beds of stratified tuff (ash), which are erroneously termed "lava."

With the able assistance of Mr. H. C. Hosking, B.A., Dr. Fenner investigated the limits of the ash deposits and mapped these as shown in fig. 2. The unsymmetrical distribution of the finer material at once suggests the influence of the prevailing winds as the chief agent of its distribution. Detailed enquiries serve to confirm the idea that the ash distribution was governed by winds similar in direction and velocity to those of the present day.



Summing up the large amount of evidence available, it is concluded that Mount Gambier and its associated vents represent a western marginal outburst from the great basaltic magma that gave rise to the Victorian Newer Basalts, occurring near the close of the Newer Basaltic Period and possibly dating to quite late prehistoric time, possibly just prior to the appearance of the blackfellow on the scene.

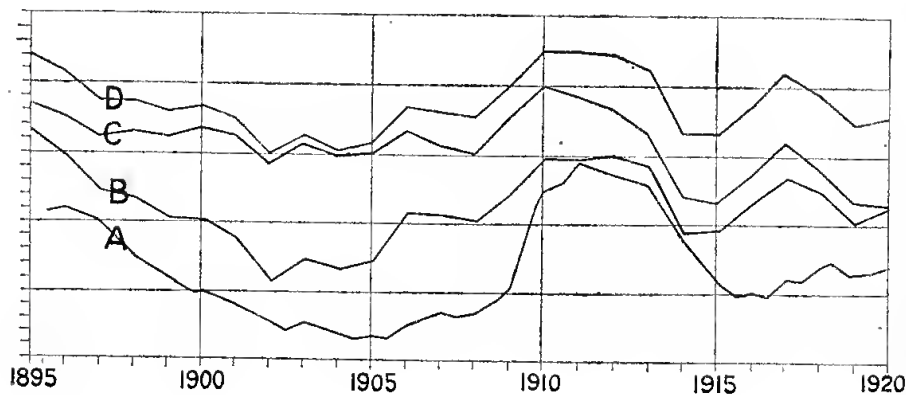
That there were at least three craters at Mount Gambier itself is clear from the available evidence. There was a brief explosive phase prior to the basalt flow, and the former probably came from the western crater, as did the lava. Possibly

the order of activity was:—1. An explosive outburst from the Mount Gambier crater; 2, a brief effusive phase at the same focus; 3, renewed explosive activity at that crater; 4, explosive eruption of Blue Lake crater; 5, explosive eruption at Leg of Mutton crater. Still, there is no positive evidence against the idea that phases 3, 4, and 5 were contemporaneous.

The Blue Lake is the most remarkable and most fascinating of the subsided areas. The average depth of the water is 250 ft. to 280 ft., the height of the cliffs averages 250 ft. above the water, and the cliff faces are very steep. The shape of the lake is an irregular oval, and the area is 170 acres. As already mentioned, the water of the lakes is portion of that stored in the great sub-artesian tertiary basin of the ancient Murray Gulf, and the surface of the lakes slowly rises and falls, in harmony with the rise and fall of the general water-table of the whole area.

When the rainfall affecting this area is from 18 to 20 inches per annum, the level of water in the lakes remains practically stationary. From this it may be deduced that the amount of water that is added to the underground supply from an annual rainfall of 18 to 20 inches is just about equal to the loss of water from the great underground reservoir per annum. This loss is due mainly to the outlets along the southern coastline, where it constantly gushes forth in great quantities.

If we regard the underground reservoir of the south-eastern district as a closed system with an annual overflow equal to the average annual increment of water received from an annual rainfall of 18 to 20 inches, then we may construct a graph to show the relation between the rainfall and the rise or fall of level in the Blue Lake.



In the graph, the line A represents the actual curve of variation in the water level at Blue Lake. The line B represents the curve showing the cumulative variations from an annual rainfall of 19 inches in the County of Lowan (Victoria). The line C (placed over A and B) represents a similar curve based on the variation from 20½ inches per annum in the south-eastern counties of South Australia.

From the close correlation disclosed by these graphs the maximum rise and fall of water level for January may be prophesied at the close of the preceding winter's rainfall.

A model of Mount Gambier and the lakes, built to exact scale, has been constructed by Dr. Fenner, and a copy of same will be among the South Australian exhibits at the Empire Exhibition.

LIST OF NATIVE PLANTS GROWING IN THE RAILWAY RESERVE AT MILE END.

By Ernest H. Ising.

In an early number of this journal (Vol. I., No. 3, 1918) Mr. J. M. Black gave an article on "The Primitive Flora of Adelaide" and noted 27 native plants growing in and around the city at that time. Mr. Black's list includes plants which were growing in the little piece of natural scrub at Enfield which has been preserved intact. The railway property at Mile End has been enclosed for a long time and quite a number of native plants have been flowering there from August last. Specimens have been collected and notes of the flowering period, etc., were taken of 17 species only four of these being mentioned by Mr. Black in the above article. Observations have been carried out since last August and no doubt the list could be augmented during the next 12 months.

The species marked (B) were those recorded by Mr. Black, whose new "Flora of South Australia" has been followed in the following arrangement of families.

Graminae. (B). **Stipa scabra** Lindl. Common spear grass. This grass is very plentiful and was flowering during October and November. It grows in tufts about 6 inches across and up to 24 inches in height. Its silvery heads, with long fine awns, waving in the breeze give it a characteristic appearance.

Liliaceae. **Bulbine bulbosa** (R.Br.) Haw. One plant of this species was flowering in October, it is evidently rare now on the plains, it usually prefers the hills. Grasses and weeds may have killed the plants.

(B) **Dichopogon strictus** (R.Br.) J. G. Bak. "Vanilla Lily." A beautifully scented species, flowering in October. Only one flower blooms at a time and closes at night, the flowering of the long raceme extending over some weeks.

Amaryllidaceae—**Hypoxis glabella** (R.Br.). This little yellow star was plentiful and flowered during September. It is also a common plant in the hills.

Calostemma purpureum (R.Br.). A summer-flowering plant with purplish flowers. The flower stems appear before the leaves which die in the spring. To be seen in masses at Eden and in scattered places along the foothills above Mitcham.

Chenopodiaceae. (B.) **Atriplex Muelleri** Benth. "Mueller's Saltbush." A fair number of this species is found at Mile End where it is protected from stock. It has a spreading habit with many lax stems trailing over the ground. Flowering in spring and fruiting in February.

Bassia enchylaenoides F.v.M. This plant is plentiful; it is a perennial with a thick rootstock from which new shoots spring each year. The young branches are densely hairy but this covering wears off in time. It flowers and fruits in the spring and summer. The fruits of this genus usually bear several spines but as the above species is devoid of this character Mr. R. H. Anderson (Proc. Linn. Soc. N.S.W. Vol 48, pt. 3, 1923) proposes to remove it to another genus.

Amarantaceae—**Trichinium spathulatum** R.Br. Several plants of this species were observed flowering in the spring. It is a perennial and the rootstock (in one plant dug up) is almost fleshy and about half an inch (10 mm.) thick. This would enable the plant to endure long dry summers; the clay soil in which it is growing is very retentive of moisture. No doubt these factors have been responsible for the preservation of this plant on the plains.

Leguminosae—**Acacia pycnantha** Benth. "Golden Wattle." One plant growing on the top of a railway cutting, in flower in September.

Acacia, sp. One shrub in flower in October. From the appearance of the base of the trunk this plant is a number of years old, although it is only about 5 feet in height. The flowers were numerous but no fruit has been seen; this is accounted for, I feel sure, by the absence of pollinating insects, none of which were observed during frequent visits paid to the plant while in bloom. On the side facing the prevailing winds many dead branchlets were in evidence; these protected the inner branches which maintained a full foliage.

Lotus australis Andr. Several plants of the legume were growing in a cutting where it is not difficult to account for their appearance, but a plant growing on undisturbed flat among spear grass is not so easily explained unless it is a relict of the original flora. This species grows plentifully near Mitcham station (it is also well known further along the hills line) and its occurrence at Mile End need not occasion much surprise. It flowers in September and October.

Hardenbergia monophylla Benth. "Native Lilac or Sarsaparilla." A species that grows at the entrance of the hills and most likely was once numerous on the plains when they were wooded with red and blue gum and peppermint. The solitary individual seen was in flower during September and was growing on the edge of a railway cutting.

Oxalidaceae. **Oxalis corniculata** L. "Native Soursop." Growing everywhere and flowering in spring and summer. Not a pest like the introduced species.

Zygophyllaceae. **Tribulus terrestris** L. This plant was evidently brought from the north (its native habitat) amongst engine coal as it is growing alongside repair tracks. This plant with its spiny fruits could easily become a nuisance if not a pest. Flowers in December to February.

Malvaceae. **Lavatera plebeia** Sims. Several clusters of this plant were in flower in October and grew to three feet in height. This is a widespread species but not numerous in the southern districts, as it prefers the drier northern areas.

Convolvulaceae. **Convolvulus erubescens** Sims. A trailing perennial flowering in the summer, January to March. Common but not a pest.

Compositae. (B.). **Vittadinia australis** A. Rich. A perennial undershrub growing to about 18 inches in height; plentiful on the plains on uncultivated land and flowering from October to February.

EXCHANGES.

"The Victorian Naturalist," December and January Numbers.—The January number contains a fine introductory article on the Spider, containing a simple reference key to the families that have been recorded in Australia.

"Smithsonian Reports." "Ant Acacias and Acaecia Ants of Mexico and Central America." The Ants live only in the spines of certain species of Acaecias, and are said to defend the plants from the ravages of insects, particularly the destructive leaf-cutting insects.

"The S.A. Ornithologist" for January, 1924.—This number contains a long and interesting account of the recent trip of the ornithologists around Eyre Peninsula.

"Journal of the Arnold Arboretum of Harvard University, U.S.A."

Mr. N. H. Seward, of 457 Bourke Street, Melbourne, forwards a **Catalogue of Microscopic Slides** which should prove of great interest to our microscopist members.

The Author, Mr. Edwin Ashby, F.L.S., M.B.O.U., kindly forwards the following publications for our Library:—(a) "Monograph on the Australia Lepidopleuridae, Order Polyplacophora, with a Description of a New Species." (b) "A Review of Ischnochiton (Haploplax) Smaragdinus, Angas, 1867, and its Congeners, together with the Description of Two New Chitons from Papua." (c) "Notes on a Collection of Polyplacophora, from Carnarvon, Western Australia, with Definitions of a New Genus and Two New Species." (d) "A Review of the Australian Representatives of the Genus Cryptoplax, Order Polyplacophora." (e) "A New Species and Sub-Species of Aeanthochiton." (f) "Notes on the Genus Stenochiton and the Discovery and Recognition of the Type of Blainville's Chiton longicymba in Stenochiton juloides, Adams and Angas." (g) "The Polyplacophora of King Island, Bass Strait, with Description of a New Sub-Species."

Annual Report of the Woods and Forests Department of South Australia. By Walter Gill, F.L.S., etc.

"The Australian Naturalist" (N.S.W.) for January, 1924.—The chief article deals with the Plants of the Bible. There is also a most informative article on the Natural History and Wild Flower Exhibition held in Sydney on October 17 and 18, 1923.

SOUTH AUSTRALIAN AQUARIUM SOCIETY.

Herbert M. Hale.

The annual week-end camp was held at Murray Bridge, towards the end of last month, under the able leadership of Mr. R. T. Foster, and as usual proved most enjoyable.

The syllabus of the Society is now being prepared and the Committee is endeavouring to arrange the fixtures so that they will not clash with the arrangements of the Field Naturalists' Section.

The Aquarium Society was inaugurated on March 13th, 1918; this is the seventh year of the Society's activities, and it is hoped that members will assist to make it a most successful one. The meetings are held at Mr. Hosking's rooms, Norwood; members of the Field Naturalists' Section interested in aquatic subjects are cordially invited to attend.

COLLECTING MOLLUSCA (SHELLS) AT THE OUTER HARBOR *By C. WALTON.*

Situate $13\frac{3}{4}$ miles from, and within 35 minutes' train journey of, the City of Adelaide is what is admitted to be one of the best and safest harbors in Australasia, which is known as Outer Harbor. So complete has been the success of the designers of this place that boats in the roughest weather can lie with perfect safety, and at low tide the depth of water is never less than 33ft. It is here that the great Ocean Liners and other large international trading ships put in. It presents an interesting spectacle to the visitors to the Harbor to see these large steamers resting peacefully, as it were, on the surface of the water with the busy movement all round of passengers disembarking and embarking, but to the Conchologist it presents another viewpoint. He thinks of the busy life beneath the surface of that water ever evolving and revivifying nature. To him the discovery of a new form of shell sets him off into a line of research as to the nature, properties, and habits of that particular shell and the animal that inhabited it.

So far as I have been able to ascertain, there are no text-books extant which deal with that interesting and, to its devotees, entrancing subject of collecting shells. By many the study of this subject is regarded as merely a hobby, but to me, as a diligent student of Conchology, it has proved both of educational and scientific value, and being anxious to impart to others, who desire it, the knowledge and results of my experience on this subject, I have written this short essay in the hope that it may prove interesting and useful to those in search of enlightenment and who are willing to help themselves.

In the first place it is necessary to provide yourself with a suitable equipment if you wish to reap a full return for your labors. Therefore you will require a strong pair of boots to wear in the water, as it is into that you must go if you wish to succeed. You will also need a receptacle in which to place your specimens; for this purpose I find one of those jars known as a Mason's or Signal the most suitable. Do not use a metal receptacle, as the metal, when brought into contact with salt water, is fatal to Chiton life. When you start on rock-turning you will require what is generally known as a bale-hook to assist you (this hook I find preferable to anything else I have tried or heard of); also a knife—the common sheath-knife will serve for all purposes. At times you will meet with specimens where your jar is not suitable, when it will be handy to have a small bag, and in your pockets, say, two or three small bottles or phials, which you will find very useful; and last, but not least, you will find a strap, such as a common coat-strap, with three or four snap-hooks attached, and worn crosswise under the left arm and over the right shoulder, pulling it fairly close under the arm. On these snap-hooks can be hung your jar, bag, knife, and bale-hook, when you are working in the weeds, and thus free your hands from encumbrance. The bale-hook and knife should have a strong piece of line attached with a loop just large enough to slip your hand through, and at such a distance from the handle that when it is hanging loosely from your wrist it can be readily grasped. Now being fully equipped, I would suggest that when you meet with a live specimen that you do not require, *do not take it*—"Do not destroy life," except where necessary, for you cannot give it.

It is not my intention to deal with every shell that may be found and recorded in that very useful catalogue compiled by Sir J. C. Verco in July of 1908, but with those only that I have been fortunate enough to discover with the assistance and advice of Mr. E. H. Matthews. After receiving from him his most invaluable help and advice, coupled with my own practical experience as the personal result of research, I feel it not only my privilege but my duty to pass it on to others. In the classification of this catalogue it will be found that item 4 starts with the family known to us as Polyplacophora, or more commonly called Chitons. As it is while collecting specimens of these multivalves that many different sorts of shells, both univalve and bivalve, are secured, I propose to first deal with the Stenochitons. If you will imagine that you are in that mass of weed, growing just below low-tide, inside the stone wall on the south side of the Outer Harbor, with your jar filled with salt-water ready to place your specimens in so that they may be kept alive until such time as you return to your home or to where they are to be dealt with, I will start with—(1) *Ischnochiton Stenochiton juldoides*. This will be found at the root of that broad weed, known as *Posidonia*, that grows so plentifully all along our coast just below low-water mark. If you will pull this weed out from the roots you will find this animal living beneath the sheath near the root, and it can be readily removed with the thumb and finger and place in your jar. Exercise every care when taking specimens of the Chiton family so as not to injure them. This particular shell I have found in large quantities at the Outer Harbor. When you have examined the bottom of this weed do not throw it away until you examine both sides of the leaf-part as there you will find that beautiful little shell (2) *Nacella parva* and (3) *Stenochiton posidonialis*. Under, and mixed in the roots of, this weed will also be found (4) *Paphia galactites*. You will notice a weed, similar to the one I have just mentioned, but longer and much narrower, known as *Zostera tasmanica*, growing close by. If you will pull a handful and examine all along the leaf on both sides you will find (5) *Stenochiton pilsbryanus*. While working among these weeds you will notice a wiry weed carrying a leaf, at first sight, like the olive tree, known as *Cymodocea*. Grasp a handful of this, fairly low down, and pull it out; first examine the leaves, for here lives (6) *Phasianella australis* in its adult form, (7) *Phasianotrochus bellulus*, (8) *irisodontes*, and (9) *nitidulus*; (10) *Cantharidus lehmanni* and (11) *pulcherrimus*, (12) *Thalotia conica*, (13) *Bankia fasciata*, (14) *Modiolaria paulucciae*, some of the (15) *Pyrenes*, different varieties of *Starfish*, and a short-spined *Echinus* (commonly called a sea-egg). After a thorough overhaul of the leaves, search on the base or bare parts of the stem and there you will discover a small *Stenochiton* known as (16) *cymodocealis*. Pick up and examine any pieces of dead *Pinna* shell for it is on these that (17) *Crepidula immersa* and (18) *Placuanomia ione* is found. While you are working among the weeds look out for (19) *Fusus australis* and (20) *ustulatus*, also (21) *Fasciolaria australasia*, crawling among the weeds, and should you be well out you may pick up a specimen or two of (22) *Olivu australis* on the sand patches. There are also a few specimens of (23) *Pinna inermis* scattered about. On this *Pinna* you will find (24) *Haliotis cyclobates*, and very often a specimen or two of (25) *Ischnochiton contractus*, while at the base, on the surface of the sand (26) *Conus anemone*. It was here that I secured my best specimens of *Haliotis cyclobates*, not only as to size, but also quality, and they were beautifully colored. You will at times find (27) *Capulus australis* clinging to this *Haliotis*. When the tide turns and it becomes necessary to retire from your weed-work, get out to the edge of the tide on to the sand-banks or rises; walk too and fro on them, watching from the edge of the tide to about 10ft. up the rise as some of the sand-living shells come out on tide's turn. Some crawl to meet the incoming tide, while others lie on top of the sand until the water reaches them. Here I have found (28) *Lyria mitraeformis*, (29) *Chione lagopus*, (30) *Tellina victoria* and (31) *albinella*, (32) *Mitra glabra*, (33) *Sigaretus zonalis*, (34) *Glycimeris striatularis*, (35) *Solemya australis*, (36) *Classis fimbriata*, (37) *Mactra ovalina*, and (38) *pura* in beautiful form. As the incoming tide sends us back to the shore you will note some old piles standing erect in the sand, examine these and you will find specimens of (39) *Siphonaria diamensis*, (40) *Modiola semivestita*, and in the masses of *Serpulæ*

encrusting the piles a careful search will reveal the presence of (41) *Lasaea scalaris*. *Siphonaria diamentis* can be readily removed with your knife; take every care so as not to break the edge of the shell. We will collect in the sand (42) *Chione scalarina* and (43) *strigosa*, hidden away but readily discovered by its tangle, which is a small piece of green weed showing on the surface of the sand. (44) *Polinices conica*, this animal crawls along just under the surface of the sand leaving a raised trail that can easily be detected. (45) *Soletellina biradiata* can be found by a semi-circular mark in the sand as though the point of a knife had been drawn along the surface, this animal sometimes throws itself out of the sand as the tide is coming in. (46) *Mesodesma elongata* and (47) *glabrella* are hidden away but they are found readily, just under the surface of the sand, in pools of water left by the tide. (48) *Anapella cuneata* is very plentiful, well up, near high-tide mark, about a quarter of a mile in a southerly direction from the reclaimed part of the Outer Harbor. The last time I visited this place they were in myriads. With reference to this animal I might state, for the benefit of those who are fond of our so-called cockles as a food, that this kind, though small, are the best eating, not being tough, like the larger varieties. Take a few spare specimens of *Anapella cuneata* in your pocket as bait. Some of you will have noticed shells, especially bivalves, such as cockles, on the beach with a hole cut through as though it had been drilled. *Polinices conica* and the *Arcularias* are the animals that do this. To secure specimens of *Arcularia* and *Cominellas*—the quickest way to do so is to open a specimen or two of *Anapella* and place them in a pool; there may not be any in sight, but if there are any about they will show themselves in about one minute or less, when, as a rule, you can collect all you may require of both (49) *Arcularia fasciata* and (50) *pauperata*, also (51) *Cominella lineolata* and *eburnea*. *Pauperata* is the one I have found plentiful near the Outer Harbor. *Fasciata* appears more frequent as you search nearer to Largs Bay and Semaphore.

Now we will take a look over the rocks that form the bank of the Outer Harbor reclamation. On these rocks will be found (53) *Risella plana* and (54) *melanostoma*, (55) *Monodonta striolata*, and (56) *Nerita melanotragus*.

After working our way in a westerly direction until we reach what is generally called the stone wall, that runs out to the site of the old lighthouse, going well out toward the outer end, there will be found (57) *Helcioniscus tramosericus* and (58) *limbatus*, (59) *Acmea gealei* and (60) *septiformis*, (61) *Patella ustulata*, and (62) *Littorina mauritiana*.

As this will give us a fair day's outing, we will now return to our homes, or to the place where you can treat your specimens (of course your jar still contains the salt-water). You will note that not only the univalves but also the Chitons have crawled or spread themselves over the jar. First pour off the salt-water, then fill your jar with fresh-water and you will observe that the fresh-water kills the Chitons instantly. Let your jar stand for, say, five minutes, then pour the contents into a bowl or dish. Place your specimens of Chitons out flat on laths and tie down with tape or string, seeing that the girdles are not turned in; then put them away to dry, but in a place where mice cannot get at them.

All the univalves and bivalves that are of a porcellaneous nature may be placed in BOILING water for 3 to 4 minutes, after which the animal can be readily removed. In the case of univalves, be careful to secure the operculum. In the case of bivalves, after securing the animal, close the valves carefully and wrap in paper; they may then be put away for a day or two to allow the hinge to dry. The shells should always be kept together, and not broken apart, as is so often the case. If at any future time you wish to examine the inside of a bivalve that has been closed, just place it in warm water for two or three minutes and it will generally open of its own accord. The shells that are not porcellaneous (i.e., enamel) should be buried in sand, or other dry material, until the animal dries up; you can then shake it out.

Wooldridge Street, Peterhead, October 1st, 1923.

The South Australian Naturalist

The Journal of the Field Naturalists' Section of the Royal Society of South Australia.

Adelaide

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May, 1924

No. 3

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“The South Australian Naturalist”—Editor, Mr. Wm. Ham.
F.R.E.S. Address: The University, Adelaide.

FORTHCOMING EXCURSIONS.

- May 24—Stonyfell and Gandy's Gully. Botany, &c. Burnside tram opposite “Register” Office, at 2 p.m. Leader, Mr. J. A. Hogan.
- June 9—Port Willunga Scrub. Charabanc from Town Hall, 8 a.m. Leaders, Dr. R. H. Pulleine and Mr. W. J. Kimber.
- June 21—Museum. Meet at entrance at 3 p.m. Leader, Mr. Edgar R. Waite, Director of the S.A. Museum.
- July 5—Belair. Forestry. Train to Belair, 2.3 p.m. Leader, Mr. Walter Gill, late Conservator of Forests.
- July 19—Waterfall Gully. Botany, &c. Burnside tram, opposite “Register” Office, 2 p.m. Leader, Mr. J. A. Hogan.
- August 2—Morialta. Biology, &c. Tram, 2 p.m., opposite “Register” Office. Leaders, Prof. Harvey Johnston and Mr. H. M. Hale.
- August 9—Marino. Cliff Flora, &c. Train to Marino, 1.48 p.m. Leader, Mr. G. Beck.
- August 16—National Park, Belair. Physiography, &c. Train to Belair, 2.3 p.m. Leader, Dr. C. Fenner, F.G.S.
- August 30—Grange. Shells, &c. Train, 1.42 p.m. Leader, Mr. J. Kimber.

EVENING LECTURES.

- May 20—“Some Interesting Rocks and Minerals.” Dr. C. Fenner, F.G.S. “Wood and Rockboring Molluscs.” Mr. W. J. Kimber.
- June 17—“Gippsland Ranges and Lakes.” Mr. H. Horswill.
- July 15—“A Month in South Africa: Some Botanical Impressions.” Mr. G. Samuel, B.Sc., Lecturer in Plant Pathology.
- August 5—“The Cultivation of the Sturt Pea: (*Chionthus Dampieri*).” Dr. Owen M. Moulden.
- August 25 to 31—Meetings of Australasian Association for the Advancement of Science at Town Hall and University.
- September 2—Annual Meeting. Exhibit evening. Presidential address.

THE South Australian Naturalist.

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No. 3.

SANDHILL PLANTS.

Different species of plants have adapted themselves to almost every soil and to practically every variation of climate and situation. The botanist calls the study of these relations between plants and their surroundings (or environment) Plant Ecology. We are making observations in Plant Ecology when we cross the parklands and notice the different weeds on the rises, and contrast them with those growing down in the hollows. On a bigger scale, we note the great plains covered with saltbush and bluebush, the ranges with their stringybark trees, and the creeks with their red gums. The deep, rich soils bear a wonderful variety of plants, but even the stoniest part has a few plants which have adapted themselves to the hard conditions of life, with little soil and less water. The sandhills of the coast, such as those which occur here and there between Brighton and the Outer Harbour, illustrate this adaptation in a very marked degree.

As we walk along the coast we recognise the saltbush, with its characteristic grey-green colour and fleshy leaves. We associate the saltbush with the drier interior, but here the rainfall is good. Why, then, should it luxuriate here? The answer is found by looking at the make-up of the soil. The soil is almost pure sand; under the lens we see it is made up of little grains of hard rock quartz along with tiny pieces of shells and corals. But compared with the grains in good soil the particles of the sand are very large, and the quantity of water held is immensely decreased. The water runs through quickly, and in a short time the sand is dry between the grains. Now, plants gain their moisture from the water held between the particles, so that a plant in sandy soil, no matter how heavy the rainfall, is really growing under droughty conditions. Hence we see the same families, and even species, of plants growing on the seashore as in the arid interior. The saltbush has become able to adapt itself to desert conditions and can flourish on the sandy shore as well as in the dry interior.

We may leave the level sands of the shore and climb up the sandhills (dunes) farther inland. We notice that a large part of the surface consists of loose sands blown by every wind,

but the greater part is held together by various plants. Where man or animals have not broken the surface, these plants hold the sand from drifting and fairly cover its surface with a mat of vegetation. The plants we see fall generally into one of two classes; either they are greyish in color like the spinifex and saltbush, or they are a dark green with hard shiny leaves like the berry-bushes (*Alyxia*). The greyish plants are protected by a natural blanket of hairs as you see by examining them. The dark green leaves have a waxy covering as a protection.

One of the commonest plants we notice is the Spinifex (*Spinifex hirsutus*). Its long, reed-like stems trail over the sand in all directions, some of them reaching a length of many yards, and giving out at every joint bunches of leaves, which push their way up through the sand and serve to hold it from blowing. The leaves are of the same silvery gray-green tint as those of the saltbush. If we examine them closely we see this appearance arises from a coating of hairs, which protect the soft material of the leaves from the abrading sand. Follow up a stem, and you find bunches of tiny rootlets at every joint, ramifying in all directions and forming a very effectual hold for the sand against the moving power of the wind. The delicate growing tip of the plant is very closely covered with stiff leaves armoured with a coating of hairs. With its abundance of rootlets penetrating in all directions, the plant is able to secure the last drop of moisture held between the sand grains. The hairs, too, are so disposed as to protect and shelter the tiny breathing pores in the leaves, these being further sheltered by being at the base of little pits in the leaves. Like most successful plants, it sets plenty of seeds, and provides for their distribution over a large area. The fruits form a stiff ball which, when ripe, falls from the plant and is blown by the wind for long distances, until caught in some hollow of the sand, where it comes to rest and is covered with blown sand. A shower will start it into vigorous growth, and the sand meets a check to its drifting.

But for these sand-loving plants the sandhills would continue to drift and bring the barrenness of desolation over the fertile lands farther back. Man has often, by destroying the natural covering of the sand, started the sandhills moving, in many places with disastrous effect. Next to man come the animals he introduces, the sheep, cattle, and rabbits together rapidly destroying the natural cover. This has happened in our own State, particularly near the Coorong. Here and in many other places man is trying to replace the plants to hold the sand from spreading. Marram grass is one of the plants relied upon to establish itself

among the sand. On the West Coast there are several spots where the same thing has happened. The sandhills near Elliston, denuded of their natural covering, began to drift and cover good soil. At great expense Marram grass was established and the sands are held.

Plants require five things to enable them to grow. These are:—(1) Water, (2) warmth, (3) food, (4) air, (5) light. Plants do not get moisture from the rain, as we catch water in tanks, but by absorbing the water held round the grains of soil. In the finest soils the particles in the soil may have a surface of as much as 3 acres in one cubic foot. In the sand this surface is a great many times less. Experiments go to show that plants require immense quantities of water, amounting probably to 250 times the weight of the plant when thoroughly dried. Not only does the sand hold very little moisture, but it also has very little humus. Hence every plant flourishing on the sandhills must have means of getting its necessary supply of moisture from a niggardly soil, and this it does in many ways, but chiefly by producing an immense growth of roots. Many plants store up water in special cells (miniature tanks). The sand becomes heated very quickly, and at night cools no less quickly. Few varieties of plants can flourish in such conditions. Some are protected by a furry outercoat, others by a hard skin. Every land plant requires a fixed base, but the sand provides only a precarious hold; here is another reason for the excessive root formation, and the long creeping stems which hold the sand so effectively. The moving sand, driven by the wind, acts as a sand blast, especially within a few inches of the surface. The hairy investiture serves to protect the delicate tissues of the plants. Some leaves, like that of the common grass of the sandflats (*Sporobolus*) are curled up to protect the openings in the leaves. In other plants these openings lie in deep pits covered with a dense coating of short hairs. Sandhill plants on all the temperate coasts of the world have to meet somewhat similar conditions, and hence in all countries there is a great resemblance in the flora, only hardy plants with special adaptations flourishing on the dunes.

Excursion to Modbury, March 1st, 1924.—The party were most hospitably entertained, and a useful afternoon was spent in examining the shells and other curios collected by Mr. Smith, who showed himself not only an ardent collector but a nature lover keenly interested in many branches of natural history.

Dredging Excursion, March 15.—The weather proved ideal, the sea being absolutely smooth and the large party under Professor T. Harvey Johnston and Mr. W. J. Kimber, obtained abundant and varied hauls of a great many forms of sea-life. The leaders gave interesting and informative talks on the material collected, and Professor T. Harvey Johnston subsequently dealt with some of the material in his lecture on March 18th. Mr. Herbert M. Hale, of the S.A. Museum, reports as follows on a few of the Crustaceans taken: A good bottom was found about six miles west of the Semaphore, and many interesting marine invertebrates soon appeared on deck. Crustaceans were largely in evidence, but to enumerate these is beyond the scope of this publication. A few of the larger forms may, however, be mentioned. At almost every haul sponge-crabs were taken in the dredge, the commonest species being *Cryptodromia octodentata*; this crab sometimes carries around upon its back a sponge several times its own weight. Two species of spider-crabs were also fairly plentiful amongst the weed. Fragments and streamers of weed are picked up by these Crustaceans and fastened on to the upper surface of the carapace by means of hooked hairs thus very effectually disguising the crabs. A small Hymenosomatid crab with a triangular carapace attracted attention by its unusual shape. It has been given a very long name—*Elamena (Trigonoplax) unguiformis* var. *longirostris*; this crab has not before been noted for South Australia, being previously described from Victoria.

Of the Prawns, the most striking species taken was the large *Crangon bidens* (formerly *Alpheus*) which is of ornate coloration. Crangon has a large cheliped limb, with a trigger arrangement of the two terminal joints with which a loud click is produced. Sound-producing organs are known to occur in a good number of Crustaceans. A Hermit crab recently taken by Professor Wood-Jones' party on Flinders Island has a stridulatory apparatus on the chelipeds. The use of these devices is not clear. Dr. Alcock has suggested that in the case of some tropical crabs (*Ocypode*), which live in holes, the stridulation possibly serves to indicate to intruders that a burrow is occupied; the stridulatory apparatus is present in the adults of both sexes.

Very many other small forms were obtained by passing weed, stones, and sponges from the dredge through a weak solution of formalin, which caused tiny Crustaceans which are otherwise overlooked, to leave their retreats. Several new Isopods were taken by this method. A detailed account of these will appear in another place.

Exhibit Evening and Lecture by Prof. T. Harvey Johnston, M.A., D.Sc., March 18th.—Ten new members were nominated. The varied exhibits filled the accommodation provided. The Chairman (Professor J. B. Cleland, M.D.) referred to the receipt of the Tepper Collection and of a number of parcels of plants for the new herbarium, including one new species of *Lepidium* from Birdsville.

The President reported that the Director of the Botanic Gardens (Mr. Bailey) was starting a special section for native plants, and would be glad to supply members with seeds for experimental cultivation. Mr. Hogan, of Morialta, also offered to help members to test native seeds under cultivation.

Mr. J. F. Bailey exhibited a large cone from a bunya-bunya tree (*Araucaria Bidwillii*), weighing 11 lb.

Mr. E. H. Ising showed a specimen of the hyacinth orchid (*Dipodium punctatum*), a white everlasting (*Isrodia achilleoides*), the hop goodenia (*Goodenia ovata*), and a wattle (*Acacia pruinosa*), the leaves of which close up at night.

Dr. Cleland showed a specimen of a poisonous fungus now recorded (for the first time in South Australia) from Aldgate. The same exhibitor also showed a specimen of a pretty but pernicious grass (*Pennisetum villosus*), now spreading in the neighborhood of Adelaide, and likely to prove very troublesome in pastures. It is said to have been introduced from Abyssinia. Dr. Cleland also showed specimens of the "stable fly" and explained in what ways it differed from the "house fly."

Professor T. Harvey Johnston then spoke on a few of the many forms of life brought up by the dredges on the previous Saturday.

A parasitic gastropod mollusc (*Lamellaria* sp.) taken from inside an Ascidian, proved to be the first specimen taken in South Australian waters. A point of interest is that though the animal had become an internal parasite, it still retained its eyes. Several interesting species of Holothurians were taken. These are generally sausage shaped bodies with warty skins and are related to the Beche-de-Mer or Trepang of commerce. Some species eject their interior organs when captured, and one specimen will fill a bucket with its sticky white thread-like intestinal organs. These "cotton spinners" are a great nuisance in dredging.

Another specimen exhibited resembled a maggot-like worm, which shot out from its body a proboscis almost as long as itself. This Nemertean Worm, now first taken in South Australian waters, is distantly related to the fluke and the tape-worm.

Many Ascidians or Tunicates, commonly called "sea squirts," were also taken. Some of these are solitary but others live in colonies, a gelatinous mass containing scores of separate animals arranged in sort of star or daisy pattern of light yellow on a purplish ground mass. The material of which their bodies is composed is closely allied to Cellulose, the characteristic material of plants.

Excursion to Mr. A. A. Simpson's Garden, Undelcarra, Burnside, March 22, 1924.—A large party availed themselves of Mr. Simpson's kind invitation. Many of the trees were planted about 70 years ago, including hoop pine, bunya pine, and others. Delightful vistas were obtained from various vantage points, and the creek flowing through the grounds gave added beauty to the scene. Several species of eucalypts are planted including lemon scented gum (*E. citriodora*), river red gum (*E. rostrata*), red flowering gum (*E. calophylla*). The native cherry (*Exocarpus cupressiformis*) was growing well, also the Norfolk Island pine.

Mr. Simpson is a bird-lover as well as a nature-lover, and he has noted about 50 species of birds in his garden. Native plants are cared for and a small area of natural scrub is fenced off. Among the plants seen were *Calythrix tetragona*, *Calocephalus citreus*, *Astroloma humifusa*, *Pimelea* 2 spp., *Vittadinia australis*, *Goodenia amplexans*, *Xanthorrhoea semipilana*, *Olearia ramulosa*, *Acacia pycnantha*, *Wahlenbergia gracilis*, *Loranthus pendulus* on *Eucalyptus leucorylon* and *L. Exocarpi* on *L. pendulus*, *Hibbertia sericea*, *Hakea rugosa*, *Melaleuca* sp., and *Lomandra dura*.

The host and hostess very kindly provided afternoon tea and were heartily thanked for their kindness.

Excursion to Hallett's Cove, April 21, 1924.—A party of enthusiastic members led by Dr. C. Fenner, F.G.S., visited this locality on Easter Monday. The attention of the party was first drawn to the effect of rain and weather in sculpturing the softer rocks in the valley of a small stream.

The purple slates of Cambrian age are here covered with a bed of till, rock formed from the deposits of material brought by glaciers and perhaps deposited from the icebergs, which floated away from glaciers. Indisputable evidence still remains in the polished and striated surfaces which have been preserved by being covered up during long ages and

are only recently uncovered by the wearing away of the superincumbent strata. The many "erratics," big boulders of varying mineral composition, afford evidence of glacial origin, the granite boulders having been brought from the neighborhood of Port Victor, in a north-westerly direction.

In the same neighborhood are found fossil beds of Pliocene age containing numerous casts of shells. The whole is overlain by the more recently formed Travertine, a layer of limestone formed just beneath the surface. The waves along the coast have eroded the rocks and planed them down to a level plain of marine denudation.

The entomologists of the party were rewarded by finding many specimens of the "trap-door" spiders.

Excursion from Henley to Glenelg, April 5, 1924.—A party under the leadership of Mr. W. Ham studied the peculiar flora of the sandhills. A condensed report of the leader's remarks appears under the head of "Sandhill Plants."

Excursion to Kinchina, April 25, 1924.—A small party of members visited Kinchina on Anzac Day, the leader being Mr. J. Sutton, who has during the last two years visited the locality at least 30 times to observe the bird life, which is still plentiful. Mr. Sutton stated that he had observed 92 species of birds in this locality, and on Friday, 33 species were noted during the day as follows:

Bronzewing, purple-crowned lorikeet, crimson rosella, red-backed parrot, welcome swallow, jacky winter, red-capped robin, hooded robin, grey fantail, willie wagtail, crested bell bird, rufous-breasted whistler, grey shrike thrush, black-faced cuckoo shrike, southern scrub robin, white-browed babbler, white-fronted chat, little thornbill, chestnut-tailed thornbill, yellow-tailed thornbill, southern weebill, dusky wood swallow, whitefaced swallow, yellow-tailed pardalote, brown-headed, striped, singing, yellow-plumed and spiny-cheeked honey-eaters, red wattle bird, diamond firetail, grey butcher bird, white-backed magpie.

The plants of the district are very interesting, being chiefly of the mallee type. The vegetation is adapted to withstand dry conditions. The leaves of the plants are either thick and leathery or glossy and sticky, such leaves being able to prevent undue loss of moisture. Some leaves have a dense hairy covering and by this prevent excessive transpiration. Five distinct types of mallee were seen, the most plentiful being the white or red mallee (*Eucalyptus gracilis*).

Excursion, Long Gully to Belair, Saturday, 10th May, 1924.—A large party of members took train to Long Gully, under the leadership of Messrs. Walter Gill, F.L.S., F.R.I.S., and Mr. A. Wilkinson. The day was beautiful and the walk through the green verdure and lofty trees of this part of National Park was delightful indeed. The small gully from Long Gully Station was observed to grow chiefly the manna gum (*Eucalyptus viminalis*, Labill). The bark at the base of the trunk of this species varied a good deal, i.e., on some trees there was hardly any dark, rough bark, while on others it extended upwards for 10 to 15 ft. and beyond the lower branches. Usually the rough bark was borne on the base of the trunk up to about 8 ft.; the trunk and branches above that were light in color and smooth. This upper bark decorticated in long strips and the tree is often known as "ribbon" gum on this account. The stringybark (*E. obliqua*, L'Her.) was seen in some numbers in the first part of the walk, but it did not grow out of the range where it debouched into the main part of the park, nor was it seen at a lower altitude than about 1,200 ft. The red gum (*E. rostrata*, Schlecht.) was not at all plentiful within the track traversed. The yellow gum (*E. leucoxylon*, F.V.M.) was seen in some numbers on the ironstone ridges, but they were not large trees. The blackwood (*Acacia melanoxylon*, R.Br.) was only represented by small specimens, and they preferred the higher altitudes with a corresponding heavier rainfall. Not many trees of the native cherry (*Exocarpus cupressiformis*, Labill.) were observed, as this species does not form dense stands. The trees are usually very symmetrical and the bright green of the slender, numerous branches makes a pleasing contrast in the eucalyptus forest.

E.I.I.I.

April 15, 1924. Lecture, "Glaciations of the Past, with Special Reference to Australasia." By L. Keith Ward, B.E., Government Geologist.

The lecturer began by saying that there could be little doubt that the features of outstanding interest in the geological history of South Australia were the changes produced by the agency of ice. At least three glacial epochs were recognised in the record of this State.

Existing glaciations are of two main types: (a) Continental glaciers or ice-caps as seen in Greenland and Antarctica, (b) valley glaciers as in the Alps. The remains of ice action include the deposition of tillites, the polishing of rock floors

and the formation of grooves and striae in the rocks and boulders left behind. Such remains are found in many countries, now as in Australia, quite free from glacial action. Possibly the remains of the most ancient ice-fields are found in Canada, the glacial beds covering a proved area of about 1,000 miles by 100.

In South Australia tillite beds deposited by ice action in Cambrian times occur over a large area. Probably the most accessible area is that disclosed in the gorge of the Sturt River, extending from Eden Hills Railway Station to the South Road, near the Flagstaff Hotel, at Sturt. Near Mount Grainger, Mr. R. L. Jack has mapped the tillite beds and ascertained that they include deposits respectively 615 feet and 890 feet in thickness. The Tapley's Hill clay-slates, so largely used in Adelaide as building stone in most of the early erections, were probably formed by the redistributed rock meal which had been deposited under seasonal conditions, and owed its well-known banded appearance to alternating layers of fine and coarse material. Possibly these tillites owe their deposition to the agency of floating ice coming across the sea from land to the westward.

In many countries of the world signs of a later glaciation (possibly Pleistocene) have been described. To this series belong the glacial tillites of the Inman Valley, Hallett's Cove, Kangaroo Island, and Lower Yorke Peninsula. There is evidence to show that these deposits were laid down by land ice travelling from east to west along valley bottoms, with an extension to the north as far as Hallett's Cove.

Still further evidence of glaciation has lately been received from Central Australia. Just within the Northern Territory, on the Finke River, there is an outcrop of typical tillite with many striated boulders scattered through it. There are other outcrops in the same region, but further research is necessary to determine the extent, origin, and geological age of the deposited rock.

Another problem arises from the occurrence of large numbers of boulders resting on the Lower Cretaceous shale occurring in parts of the Great Artesian basin, and first recorded by Mr. H. Y. L. Brown in 1894. There is very little evidence as yet available upon which to deduce any conclusion respecting the age of this latter glacial period.

In the Kosciusko tableland of New South Wales we find clear evidence of two stages of glaciation. The snow-line of the earlier stage descended to about 3,000 feet below the existing snow-line. A second and less extensive glaciation followed, in which valley-glaciers were formed, leaving their

traces in lateral and terminal moraines, also glacier lakes, erratics, glaciated pavements, and polished rocks.

In Tasmania and the South Island of New Zealand there remain extensive traces of former glaciations.

Many theories have been advanced to account for the climatic changes which have undoubtedly occurred. One theory attempts to account for changes by variations in the eccentricity of the earth's orbit and in the inclination of the earth's axis to the plane of its orbit.

Other theories look to terrestrial changes to produce variations in climate. Among these may be classed variations in the elevation of the land in the distribution of the land masses. Such variations would have very great effects on the atmospheric and oceanic circulations (winds, currents, &c.), and consequently on climate generally.

Variations in the composition of the atmosphere, especially in respect to the amount of dust, carbon dioxide, ozone, or water vapour present have also been suggested.

Variations in the amount of heat received from the sun have been suggested as causes for great climatic variations. Much depends on further research into the nature and sequence of all solar phenomena before this seemingly plausible hypothesis of climatic variation can find full acceptance.

South Australian Aquarium Society.—A meeting of the Society was held on April 29th, at which Mr. Kimber delivered a most interesting address dealing with the history of Willunga, and with the fossils and marine specimens found in the vicinity. During a recent camp of some members at Port Willunga good specimens were collected, and many of these were exhibited by the lecturer in illustration of his remarks.

The syllabus for the current session is now printed, and the evening fixtures for the next quarter are given below. Any members of the Field Naturalists' Section interested in the subject matter are cordially invited to attend.

June 3rd—Microscopic exhibits, Mr. J. W. Hosking.

July 1st—Aquatic Life, Mr. Wm. Ham.

Meetings are held at the rooms of Mr. J. W. Hosking, 77 Sydenham Road, Norwood, at 8 p.m.

HERBERT M. HALE.

EXCHANGES.

"The Victorian Naturalist," February and March numbers.

"The Queensland Naturalist," December, 1923.

"The Australian Naturalist" (N.S.W.), April, 1924.

"TOWN PLANNING ASSOCIATION, VICTORIA."

In this little pamphlet of 18 pages, the Association make a number of suggestions for the civic improvement of Melbourne and suburbs. Many of the topics dealt with will be found helpful by those members of our Section who are interested in similar problems in our City. The Association asks in the first place for a careful regional survey of the country surrounding the metropolitan area. They suggest provisions for securing an agricultural belt round the outskirts. Provision is made for an Outer Park Ring, to be joined together by park ways. A new Civic Centre, and Garden Suburbs are also suggested as well as the provision of Children's Playgrounds. The Association goes on to discuss many important problems such as those relating to arterial roads, sewerage, hospitals, railways, tramways, &c.

The National Parks Section of the Town Planning Association is active in preserving the national reserves, in securing additional areas, and in having reserves declared sanctuaries. Successive deputations have secured many advantages for the citizens by their prompt action in protesting against the nibbling away of reserves and open spaces, the promotion of town planning, and in co-operation with other bodies, in securing the provision of open spaces in new subdivisions. In all these directions there is room for similar activities in our city.

The Association is also assisting in the proposal to plant the new highway from Melbourne to Geelong. It is pleasing to know that some notice has been taken of this proposal by the Government of our State. We commend the motto of the Association, "Beautiful cities for beautiful living."

The Association also forwards its Annual Report for the calendar year 1923. The report is of great interest to our members, as showing what can be done to preserve and extend the reserves, parks, and open spaces necessary for a rapidly expanding population.

The Victorian Naturalist, April, 1924.—An article on aquatic house-builders will be found of great interest to students of pond life.

Members will please note that Cole's Book Arcade has been removed to No. 14 Rundle Street, long known as "Wiggs." Subscriptions are hence payable to the Treasurer, Mr. B. B. Beck, at the new address.

“A CENSUS OF THE VICTORIAN FLORA, WITH VER- NACULAR NAMES.”

(Compiled by the Plant Names Committee of the Field Naturalists' Club of Victoria).

This little volume, which should prove of great interest to every Nature-lover, is the outcome of the work of a plant committee first appointed by the Field Naturalists' Club of Victoria as far back as 1907. Over 2,000 species had to be dealt with. One great difficulty arose from the fact that very few species possessed any vernacular name at all. Certain rules having been drawn up, the committee began its work of finding simple, appropriate, and pleasing names. The committee was able to publish tentative lists in the Victorian “Journal of Agriculture” in 1911, 1912, 1914, 1915, and 1916. The work of revision was aided by kindred societies, including some members of our own Section, and the result is now in the hands of the public.

The changes made in the scientific names of recent years have been incorporated, such as that of the substitution of *Dichopogon* for the well-known *Arthropodium*, the common name suggested being “Chocolate Lily,” from the well-known perfume of this flower.

A careful search reveals a wealth of beautiful, descriptive, and simple names, though, of course, there are a few cases in which further revision may be able to replace some unsuitable names.

One of the great objects of our Section is to popularize the study of our native flora, and the adoption of easy and appropriate names is certainly one of the most promising means to that end. The proposed names of some well-known plants occurring in our own State are quoted as examples:

Burchardia, Milkmaids; *Bulbine bulbosa*, Bulbine lily; *Caesia*, Bluegrass Lily; *Caladenia deformis*, Blue Fairies; *Glossodia major*, Wax-tip Orchid; *Casuarina stricta* (formerly *quadrivalvis*), Drooping Sheoke (this spelling has been adopted by the Victorian F.N. Club); *Isopogon*, Cone-bush; *Grevillea lavandulacea*, Lavender Grevillea; *Muehlenbeckia adpressa*, Climbing Lignum; *Daviesia ulicina*, Gorse Bitter-pea; *Pultenaea daphnoides*, Large-leaf Bush-pea; *Platylobium obtusangulum*, Common Flat-pea; *Kennedyia prostrata*, Scarlet Coral-pea; *Hardenbergia* (*Kennedyia*) *monophylla*, Purple Coral-pea; *Correa aemula*, Hairy Correa; *Tetratheca ericifolia*, Heath Pink-eye; *Hibbertia stricta*, Erect Guinea-flower.

The difficulty of finding a name which shall be the most appropriate in all the States is illustrated by the choice of “Rabbits' ears” for the orchid, *Thelymitra antennifera*, *T. Menziesii*,

for which this common name would be more appropriate in S.A., not being recorded for Victoria. A few species, distinguished as "Common," are so in Victoria, but not in all cases in South Australia.

From the dim past, when folk-lore first took note of the beautiful blossoms of the forest, the marsh, and the field, the long line of writers of English verse and English story have woven a spell round the names of the British flowers, a spell which binds the hearts of the far-flung Australian as it does the Briton the world over; the "wee daisy," the "blushing rose," the "nodding blue-bell," the stately "foxglove," each and all carry a thrill of associated ideas. Through centuries they have been used as most effective similes for poetic images. "Tetradlea" may leave us quite unmoved, but round the nodding purple masses of "Heath pink-eye" some magic pen may yet weave a shimmering haze of romance and imagination that will endue it with a power to touch the heart and thrill the imagination as the "wee daisy" does now. Imagine the difficulty of the Australian bard who sang:

"*Paludosa microphylla* with thy
White neck cannot vie,
And the modest *Wahlenbergia*
Is not bluer than thine eye."

Let us have names that can be used in poetry and story. It is the peculiar province of literature to light up the commonplace with the light that never was on land or sea.

Armed with this book, the Nature-lover may make a beginning in building up an enveloping glamour of story and song such as now, even to us, separated by the width of the world, surrounds the flowers of the homelands.

Copious indexes, and particularly one dealing with "Alien Plants Recorded as Naturalized in Victoria," are added. Copies may be obtained from Cole's Book Arcade, 14 Rundle Street.

THE TEPPER COLLECTION.

Through the kindness of the Instructor in Horticulture (Mr. George Quinn) the specimens contained in the Tepper Collection have been thoroughly fumigated by the officers of the Agricultural Department and have been looked over by the members of the sub-committee. A great amount of work will be involved in rearranging, classifying, and indexing the great number of specimens bequeathed to the section. Mr. Black has already found specimens of *Pseudanthus micranthus* and *Phyllanthus Tatei* in the Tepper Collection, there being no specimen of either in the Tate Herbarium.

VISIT TO THE ISLANDS OF THE SIR JOSEPH BANKS' GROUP.

By NORMAN B. TINDALE.

(Contribution from the South Australian Museum).

During March, 1923, a trip was made by the writer to the islands of the Sir Joseph Banks' Group, in Spencer's Gulf, in company with Messrs. P. J. Gibson and D. Hurrell, in the ketch "Malcolm." A week was spent, through the courtesy of Mr. Mundy, the owner, in the examination of the fauna of the different islands, and in fishing.

A visit was first made to Stickney Island, which is a roughly L-shaped island about one square mile in area, treeless except for a small group of low shrubs in a partly sheltered gully. Cape Barren Geese (*Cercopsis norac-hollandiae*) were observed in numbers and the ground everywhere gave evidences of their presence; in the gully several score of deserted nests were noticed, and four or five species of Staphylinid and other beetles taken by breaking up the nests. In a small, sandy area many penguins and their burrows were noticed. No signs of native animal life were evident around the semi-permanent spring, the location of which was indicated by tracks of the geese. About three hours were spent ashore and about 40 species of insects, mostly beetles, were taken, the decayed carcase of a goose proving a fruitful hunting ground.

Two days were spent at Spilsby Island. About two miles long and a mile wide, the greater part of the island has been under cultivation for several years. The Cape Barren geese are plentiful, at times proving a nuisance by their depredations on the crops. They nest on the outlying islets and fly from island to island in large flocks, in search of food and water. Birds were not very numerous, but a single magpie was seen and also many Rock Parrots (*Necophema petrophila*) flying around in the scrub behind the beach. A small well in a depression at the back of the beach is the only permanent water on the island, and the Brown Butterfly (*Heteronympha merope*) was noticed fluttering about and settling on damp ground near the water. The only other butterfly seen was the Common Blue (*Zizina labradus*). Among the other insects collected were specimens of a new earwig since named *Anisolabis australis*, and a winged cockroach (*Calolampra irrorata*). Beating wattles produced among others, a green bug (*Serius virescens*) one of the

Membraeidae, the members of which are remarkable because they have the thorax greatly enlarged and often developed into fantastic forms.

Two species of snakes are said to be taken on the island, the Brown Snake and the Death-adder, but they are both rarely seen. Goannas are common, living in old penguin burrows and two specimens were dug out alive. They are said to keep the numbers of snakes down.

Reevesby Island was next visited. It is composed of three nearly separate island masses, joined together by sand-spits and sandhills. The northernmost section has been cleared and here wheat is cultivated. Most of the middle section is covered with a scrub composed chiefly of juniper bushes, while the southern and largest section, about two square miles in area, is high and partly covered with juniper scrub, with one patch of three or four mallee trees on the summit of the hill. Between this section and the middle one there is an area of saltpan country on which the station house is built. This portion of the island is thickly infested with death adders (*Acanthophis antarctica*), which are so numerous that 89 were said to have been killed during the previous year. The house and poultry-yard are surrounded by a snake-proof fence about 3 ft. high, built of sheet iron, but in spite of this many are killed within the protected area. On setting fire to a small clump of shrubs near the house, two were discovered in a few minutes, escaping from the flames. They feed on the penguins, which frequent the sandhills, but the snakes have never been seen at the other house, which is situated at the north end of Reevesby, although penguins are quite as frequent in the sandhills there. There are no goannas native to the island, but the two specimens taken at Spilsby Island were liberated with the hope of providing a check on the snakes.

In burning the bushes for snakes many insects were captured escaping from the flames, including several tree grasshoppers (*Coryphistes obsкуроbrunneus*) and the Mottled-winged Mantis (*Tenodera australasiae*). Another, very small mantis, of which two specimens were obtained, belonging to the genus *Paraoxypilus*, is probably new, but both are unfortunately immature. In the small patch of mallee several beetles and other insects were taken under bark, including the cockroaches, *Oniscosoma granicollis*, and *Platyzosteria analis*. Under stones several small apterous cock-roaches

(*Loboptera halmaturina*) were also collected. Mosquitos were plentiful and larvae were noticed breeding in salt saturated pools of water on the rocks.

Fish were abundant, the principal ones caught being whiting, schnapper, snook, and rock cod. In Port Lincoln rock cod are frequently spoken of as "Cummins," after a station on the West Coast railway, indicating that not until the fish are sent as far out as Cummins are they appreciated as an article of diet. Several other fish are spoken of as "Yeelanna's." Since Yeelanna is further away from Lincoln, the reason for the name can be explained.

In all, about 450 specimens of insects were taken, besides a number of lizards and other creatures. Shags were seen to be very abundant, every rocky islet being crowded with them, while seagulls followed the boat in large flocks almost all the time.

PLANT SURVEY.

Members of the sub-committee met on April 30th and began the work of classifying the specimens already sent in. About 300 specimens were arranged and put in their respective boxes, but much work remains to be done in labelling and fully indexing each specimen. In addition to the collections noted in our last number, the following parcels were received:

- (1) From Mr. J. A. Hogan, 9 specimens from Morialta.
- (2) From Yorke Valley School, Y.P., 27 specimens.
- (3) From Mount Barker High School (Mr. J. E. Smith), 166 specimens.
- (4) From Minnie Downs Station, near Birdsville, 24 specimens.

Several parcels await classification and indexing, etc., and the sub-committee will be glad of further assistance.

Other parcels have been received from Miss A. Adcock, Inman Valley School (5 species from Port Vincent), Mr. R. C. Smith, Modbury (5 specimens from Modbury).

Two further parcels from Mr. L. Reese, Minnie Downs Station, via Marree. In one parcel a new species of *Lepidium* has been reported by Mr. J. M. Black, and a specimen of *Psoralea cinerea* is the first recorded specimen for South Australia.

The South Australian Naturalist

The Journal of the Field Naturalists' Section of the Royal
Society of South Australia.

Adelaide



August, 1924

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No. 4

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FORTHCOMING EXCURSIONS.

- August 30—Grange. Shells, &c. Train, 1.42 p.m. Leader, Mr. W. J. Kimber.
September 6—Waterfall Gully. Botany, &c. Tram, 2 p.m. Leader, Mr. W. H. Selway.
September 20—Morialta. Birds and Photography. Tram, 2 p.m. Leaders, Messrs. E. Thomas and P. H. Williams.
October 4—Long Gully. Botany and Aquatics. Train, 2.3 p.m. Leaders, Prof. Osborn and Mr. A. G. Edquist.
October 8—Eight Hours Day, Mount Compass. Botany. Charabanc, 8 a.m. Leader, Mr. W. C. Hackett.
October 10 and 11—FLOWER SHOW, TOWN HALL. Open at 3 p.m.
October 18—Botanic Gardens. Native Plants. Entrance, 2.30 p.m. Leader, Mr. J. F. Bailey.
October 25—Millbrook, via Torrens Gorge. Botany. Charabanc, 1.30 p.m. Leader, Prof. Osborn.
November 1—Belair, N.P. Entomology. Train, 2.3 p.m. Leader, Mr. N. B. Tindale.
November 15—Cherry Gardens. Orchids, &c. Charabanc, 1.30 p.m. Leader, Mr. E. S. Hughes.

EVENING MEETINGS.

- August 25* to 31—Meetings of Australasian Association for the Advancement of Science, Town Hall.
September 2—Annual Meeting and Exhibits; Chairman's Address.
September 16*—"Pigmy Races of the World," Dr. R. H. Pulleine.
October 21—"Methods of Casting Natural Objects," Mr. Edgar R. Waite, F.L.S.
"Forestry," Mr. Wm. Ham, F.R.E.S.
November 18*—"Tropical Fruits," Mr. J. F. Bailey. "Photographic Exhibits," Messrs. A. Wilkinson and P. H. Williams.
The Lectures marked with an asterisk will be held in the Lecture Room, the others in the Royal Society's Room (downstairs).

SHOWS OF KINDRED SOCIETIES.

Broken Hill, September 13th. Car for collectors wanted on Friday, 12th September. Brisbane, September 27th. Car for collectors wanted on Tuesday, 23rd September. Sydney, October 8th to 15th. Car for collectors wanted on Sunday, 5th October.

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ADELAIDE, AUGUST, 1924.

No. 4.

NOTES ON EGGS, HABITS AND MIGRATION OF SOME
AUSTRALIAN AQUATIC BUGS.

(Corixidae and Notonectidae.)

By HERBERT M. HALE, South Australian Museum.

In none of the fifteen known species of Australian water-boatmen is the complete life-cycle described; nevertheless, the eggs in themselves form an interesting study. These are inverted top-shaped, or of elongate sub-oval form, and are always attached perpendicularly from their support. Usually the base is fastened by a pad of adhesive material to weeds, stones and other submerged objects. In this publication (1) reference has already been made to the use of water-boatman eggs as food in Mexico; the eggs deposited in such huge numbers were described by Kircaldy (2). They are somewhat unusual in that they are supported by a more or less extensile, but short, stalk (Text fig. 1, a).

Four Corixid genera—viz. *Arctocorisa*, *Porocorixa*, *Micronecta* and *Diaprepocoris*—are represented in Australia. The ova and other stages of the life history of members of the last-named genus are unknown. Those eggs of our species of *Arctocorisa* and *Micronecta* which the writer has had opportunity of examining are of the more usual Corixid type, more or less top-shaped, and glued at the bluntly rounded end to their support (Text fig. 1, b).

In the case of *Porocorixa*, however, there is a difference in the method of attachment. Some time ago, the writer (3) figured some water-boatman eggs taken from the Torrens River, in April, 1921, at a spot where, at that time, our largest member of the genus (*P. eurynome*) was breeding in considerable number. As the larvae which emerged from the eggs were larger than the first instar nymphs of other Australian forms, it is certain that the species mentioned was responsible for the ova. They are of an irregular oval shape and each is borne on a long, transparent, thread-like stalk, connected to the adhesive disc attached to plant stems (Text fig. 1, c). This stalk, although fragile in appearance, is strong, flexible and elastic. The eggs taken as a whole superficially recall to mind those of the lace-wing flies. A year later Dr. H. B. Hungerford (4), in a paper dealing with the eggs of water-boatmen, described and figured the hitherto unknown

eggs of a species (*Cymathia americana*) from Minnesota, and these are borne on long stalks just as are those of *Porocorixa eurynome*.

At this stage it may be remarked that the following notes are the result of the activities of Mr. Fred. W. Shepherd, an enthusiastic Naturalist; the writer here expresses his heartiest thanks to him. In April of this year Mr. Shepherd, in a letter, mentioned that some of the pools near Broken Hill, New South Wales, were then teeming with bug life, and that two species of backswimmers and a species of water-boatman were breeding in prodigious numbers in the Stephens Creek Dam. The reservoir paddock is about fourteen miles in circumference, and is situated some miles out from Broken Hill. At the writer's request Mr. Shepherd covered the distance to the breeding pool on several occasions for the taking of notes and material.

On the western side the dam is intermittently fed by Stephens Creek; deep water occurs only at the eastern end near the pumping station, and the greater part of the water is shallow. In this shallow area eggs of the bugs were attached to stones and rubbish literally in millions, and later, as the young bugs passed through their nymphal stages, the receding water and lap of wavelets deposited rills of moulted skins on the mud. Towards the end of autumn the whole north-western side was bordered with from nine to twelve of these rills, each about nine inches in width, while in the water was a ten-inch margin of floating and submerged skins. The water was turbid, with a stinking black mud bottom; no large aquatic plants were present. A sample of material sent down for examination was remarkably foul, although passed through two changes of clean water before despatch. The mass consisted largely of *Spirogyra* and a very fine branched alga; these algae were devoid of chlorophyll and almost every thread of vegetation had eggs fastened to it. A quantity of the bugs and some stones with eggs attached were also forwarded to Adelaide; the water-boatman was another species of *Porocorixa* (*P. hirtifrons*) and the eggs obviously belong to this species. They are similar to those of *P. eurynome*, but differ in having uniformly shorter stalks and larger pads of attachment (*cf.* text fig. 1, c and d); the two bottom figures show how the apex of an egg is split as the nymph emerges. A test showed that, just as with the ova of *P. eurynome*, the stalks are elastic and, if stretched, spring quickly back when released. Also that if a continued pull is given, the pad of attachment leaves its support, but the connecting thread rarely breaks. The photograph shows how closely the ova are arranged on the stones; excepting where smaller pebbles and rubbish have been overlying it the whole surface is occupied by the eggs, indeed so crowded are they that the out-

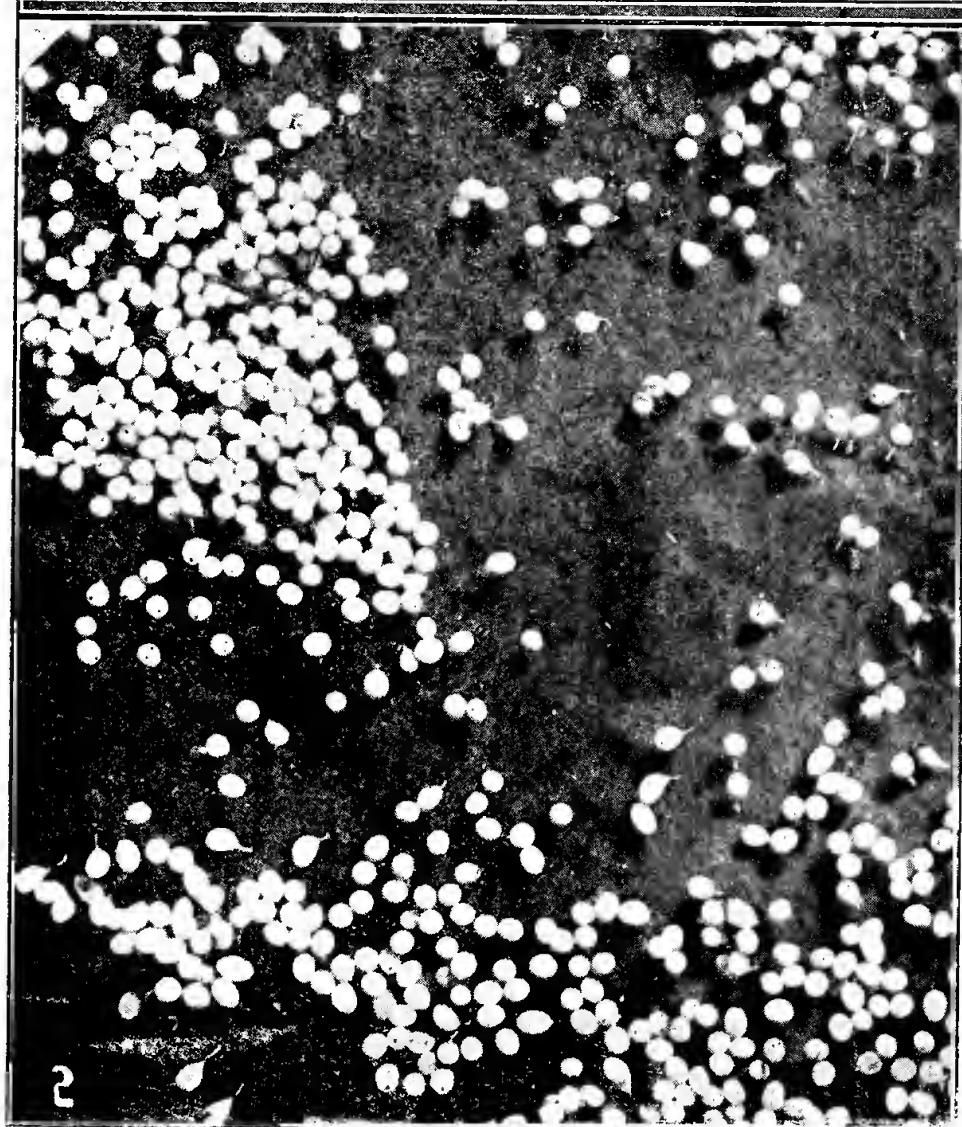
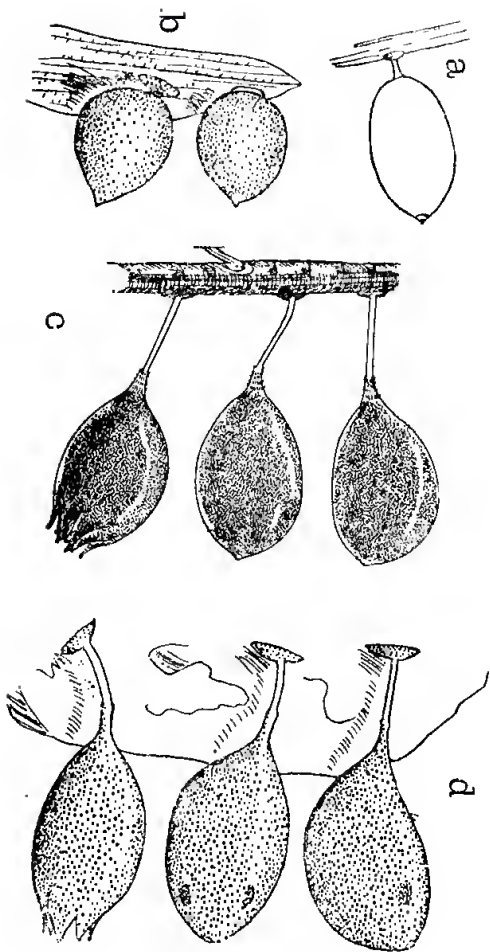


Fig. 1. Eggs of *Porocorixa curynome*, attached to *Potamogeton* stem: River Torrens, Adelaide.

Fig. 2. Eggs of *Porocorixa birtifrons*, attached to surface of pebble: Stephens Creek Reservoir, New South Wales. (Enlarged $3\frac{1}{2}$ diams.).



Explanation of Plate i.

Fig. 1.

Eggs of Water-boatmen. a, *Arctocoris mercenaria* (after Kirkaldy). b, *Arctocoris truncatipala*. c, *Porocoris eurynome*. d, *Porocoris birtifrons*.

lines of overlying objects are fairly delineated by the unoccupied spaces. A count showed that more than 300 eggs were attached to a flat, circular pebble scarcely one inch in diameter.

It has been mentioned that backswimmers (*Anisops hyperion* and *A. doris*) were also greatly in evidence in the reservoir. Mr. Shepherd notes that this is the first time in years that he has seen this water practically denuded of its usually plentiful supply of water-fleas and mosquito larvae; this is without doubt due to the depredations of the abundant backswimmers. The eggs of *Anisops* have been previously described and they may be distinguished at a glance from those of *Porocorixa* (5). Curiously enough, no *Anisops* ova were found amongst the Broken Hill material. Thinking it certain that the myriads of bugs would migrate towards winter, the writer asked Mr. Shepherd to look out for any such occurrence. In May one of a party of sportsmen who often spend a night in covert near Stephens Creek brought some *Anisops* to Mr. Shepherd, asking what they were and describing the circumstances in which they were taken. He stated that on several recent occasions, when lying on the banks early in the morning (after a night of duck shooting), his party observed "millions of these white bugs suddenly rise out of the lake, ascend to a fair height in a spiral cloud, and then make off at a good speed, as a rule with the wind; numbers fell back, and during a flight were crawling all over us."

On June 25th the water in the reservoir was rapidly lowering. By this time almost all of the bugs, both backswimmers and boatmen, had disappeared.

One evening in January, 1923, the writer carefully searched a pool in a claypan at the Myponga swamps, South Australia, and found a few backswimmers only. Early next morning, however, the muddy water was crowded with a species of water-boatman (*Porocorixa parvipunctata*). These bugs evidently flew to the pool during the night; this was at a time of full moon.

Migrations of aquatic bugs have not been previously noted in Australia, but such occurrences have been described in other countries.

REFERENCES.

1. Kirkaldy, G. W., Entomologists' Monthly Magazine, XXXV., 1899, p. 173 (See South Australian Naturalist, ii. (3), p. 55).
2. Kirkaldy, G. W., *loc. cit.*, xxxiv., 1898, p. 173, and Revue d. Entomologie, xviii., 1899, p. 95, fig. 6.
3. Hale, H. M., Records South Australian Museum, ii., 1922, p. 311, fig. 339.
4. Hungerford, H. B., Bulletin Brooklyn Entomological Society, xvii., 1923, p. 14, pl. i., fig. 3-5.
5. Hale, H. M., *loc. cit.*, ii., 1923, p. 410, pl. x., fig. 4-5.

EXCURSION TO GANDY'S GULLY, MAY 24, 1924.—

A party, under the leadership of Mr. J. A. Hogan, went by tram on May 24, 1924, to Gandy's Gully. As they climbed the steep ascent of Stonyfell, a magnificent view of hill and plain was gradually unrolled. The streets and buildings of the city, picked out with gardens and parks, and partly obscured by a thin veil of smoke, spread out like a vast canvas, with the gleaming waters of the gulf as a fitting background. The two reservoirs to the north sparkled in the afternoon sun, and even the distant blue ridges of the Hummocks could be discerned in the hazy distance. In the foreground the rich browns, royal blues, and glowing reds of the vineyards, and the sombre grey-greens of the olive yards formed a pleasing contrast to the sober-colored roofs of the dwellings and the cellars. The white cottages of the Old Folks' Home, the frowning walls of the Boys' Reformatory, and the towers of Rostrevor added an effective touch to the scene. The party were conducted by Messrs. Ifould and Crompton to the site of the vast quarry, and admired the regular stratification of the precipitous face, which is about 260 ft. in height. Several workmen near the top were prising out with crowbars huge boulders, which thundered down with a deafening crash—an operation witnessed with interest, mingled with a tinge of regret. Some perfect quartz crystals were observed, with the true crystalline form—a six-sided prism, surmounted by a hexagonal pyramid. Many which were obtained are now in the Adelaide Museum. The members were gratified to observe how Nature is repairing the devastation wrought by man. The floor on which they were standing had been the stony base of an open cut. It was now almost hidden by a luxuriant growth of native bush, which was also climbing the steep walls. The botanists were soon busy collecting specimens. The blooms were unusually early. White, scarlet, and pink *Epacris* decorated the hillsides. These plants are in blossom from May until December. The delicate mingled brown and yellow of the *Platylobium obtusangulum* (wild ivy) was also in evidence, and even the shy *Tetralthea pilosa* (black-eyed Susan) was putting forth its dainty amethyst-tinted petals. *Astroloma* (fringed stars), *Styphelia* (hard leaved), *Pimelea spathulata* (rice flower), *Isopogon*, known as "blackfellows' combs" and *Ixodia*, with its white blossoms, were also in evidence. Some of the gums, too, were in flower, including *Eucalyptus cosmophylla* (scrub gum), and *E. odorata* (peppermint).

EXCURSION TO PORT WILLUNGA FOREST, JUNE 9, 1924.—Members went to Port Willunga on Monday, June 9th, under the guidance of Dr. R. H. Pulleine and Mr. W. J. Kimber.

In a piece of natural scrub just behind the beach, many native trees and shrubs were noted. The largest plants were pink gum (*Eucalyptus fasciculosa*), which was in flower. There was also the drooping sheoak (*Casuarina stricta*). Both the male and female trees were in flower. A species of quondong and the boobyalla (*Myoporum insulare*) were seen. Rushes and guinea flowers (*Hibbertia* sp.) were present, and several species were flowering. The plants growing along the cliffs were specialized in shape. They formed cushion-clusters, and were of stunted growth on account of the winds. Mr. Kimber took the shell lovers along the beach, where he was kept busy naming specimens. Several shells of the small cuttlefish (*Sepia braggi*) were found, but the animal which makes this shell has never been found. Ascidians of peculiar form were found in holes in hard rock. Fine specimens of sponges and seaweeds were collected. An ancient aboriginal camp was visited, and several flints were found. The district proved of great interest.

VISIT TO S.A. MUSEUM, JUNE 21, 1924.—On June 21st, a number of the members paid a visit to the Museum, and were shown round by Mr. Edgar R. Waite, the director. Attention was first called to the "Records of the Museum," instituted in 1918. Mr. Waite spoke on several species of butterflies and moths, and pointed out the differences between the two sections of *Lepidoptera*. Specimens were shown from the Solomon Islands, New Guinea, and New Ireland. Butterflies from Cochin China were admired. A living blind snake was shown and described as living underground, mainly on white ants. Having teeth only in the upper jaw, these reptiles cannot bite man, and are perfectly harmless. The scales are smooth, and similar in structure all round the body. These snakes have a thorny spike near the end of the tail. A Central Australian python nine feet long was taken from its box. It has no fangs, and no venom gland, but has an array of teeth. This reptile is known as "woma." Pythons lay eggs, and, although cold blooded, incubate them for some weeks. These snakes seize their prey and crush their victims in the coils, and swallow them head first. Both the blind snake and the "woma" were freely handled by the visitors, ladies included. The shell of the hawk's bill turtle was next examined. It has no toes, but only flippers, in which respect it differs from the tortoises. Combs, bracelets, serviette rings, and spectacle frames are made from the shell. A skeleton of the green turtle, common in the waters of northern Australia, was compared with that of a tortoise. Mr. Waite then pointed out that no alligators are found in Australia, being confined to tropical America and China. The reptiles here so called

are really crocodiles. The differences between the two forms were pointed out. Skilfully executed and brilliantly colored casts of South Australian fish were greatly admired by the visitors. In the workroom were several skulls of the natives of the New Hebrides and New Britain. These skulls are sadly deformed through the strange habit of bandaging the heads of infants. The forehead is pressed back, and the eyebrows raised by the bandages, giving the skull a low arch and the whole face a stupid appearance. Obviously, too, the development of the brain was arrested, as the intelligence is of a reduced order, and the natives lack initiative. Two skeletons side by side illustrated in a marked manner the differences between the upright features of the European and the projecting jaws of the aboriginal. The difference in the facial angle was also indicated.

EXCURSION TO THE NATIONAL PARK, JULY 5, 1924.

—The National Park was the scene of an excursion on Saturday, July 5th. Delightful weather prevailed for the outing. Under the leadership of Professor J. B. Cleland the excursionists explored the picturesque reserve. Dr. Cleland identified a great variety of fungi, both indigenous and alien. The *Boletus luteus* is found in the neighbourhood of pine trees, and is probably parasitic. Many other species were discovered exhibiting a rare beauty of form and color, ranging from purple, red, brown, and yellow to a dull white. Most were pronounced to be edible. Native flowers were eagerly looked for in order to help in the projected plant survey; and, although it was somewhat early in the season, many species were found, including *Hibbertia*, *Hardenbergia*, the dainty *Drosera* (spp.), a carnivorous plant accounting for numbers of flies, gnats, and mosquitoes; *Scaevola* (so called from its resemblance to a tiny left hand), native flax (*Linum marginale*), *Ranunculus lappaceus*, the name for the popular buttercup, *Leucopogon* (White beard), *Kennedyia prostrata* (scarlet runner), the Century plant, from which a wholesome beverage, flavoured like quinine, is produced; native amaryllis, *Dodonaea viscosa* (native hop), native lilac (*Kennedyia monophylla*), *Myoporum*, *Bossiaea*, and other varieties. The trees observed included several kinds of eucalyptus—*E. odorata* (peppermint), *E. rostrata* (red gum), *E. leucocylon* (blue or yellow gum), *E. citriodora* (lemon-scented gum), *E. viminalis* (manna gum). The acacias included *A. pycnantha* (golden wattle), *A. obliqua*, *A. Baileyana* (the Cootamundra), in full bloom, *A. longifolia* (long-leaved wattle.) A great abundance of mosses and lichens was observed, exquisite in form and of the most delicate tints. Among the native birds noted were the mag-

pie, thrush, wattle bird, the purple-crowned lorikeet, the red-backed parrot, the rosella, the Regent honeyeater, and the golden-winged honeyeater. The members were sorry to observe the encroachment of the St. John's Wort, a most destructive weed, which seems to be practically uncontrolled. Unless prompt measures are taken to eradicate this pest the identification of plants in the park may soon be a simple matter, as no other plant will be able to live there but St. John's Wort.

EXCURSION TO WATERFALL GULLY, 19th JULY.—

A visit was paid to Waterfall Gully Reserve under the leadership of Mr. J. A. Hogan, the overseer, for the purpose of making a census of the native and immigrant plant life there. It was rather early in the season for an abundance of plants in bloom, however about 20 species were in flower and 40 others recorded. Mr. Hogan has been at work for many months recording the plants in the reserve, and his list now includes native and alien species. In the lower part of the reserve there are very few trees, *Eucalyptus viminalis*, the manna gum was noticed in the creek, where also was the woolly teatree, *Leptospermum lanigerum*, a plant invariably found in creeks in the hills on quartzite formation. Higher up the reserve the scrub or cabbage gum, *Eucalyptus cosmophylla*, endemic in our State, is met with as a stunted, crooked small tree 12 to 20 ft. in height. The large persistent fruits were much in evidence, and a number of trees were in bloom. Another tree was the white stringybark, *Eucalyptus obliqua*, growing in the deeper soil, while the drooping sheoak, *Casuarina stricta*, and the scrub oak, *C. distyla*, were found on the exposed rocky positions along the gully cliffs. Undershrubs of the ploughshare wattle, *Acacia vomeriformis*, were in full bloom and a number of plants of the silky guinea flower, *Hibbertia sericea*, were in flower, indicating a dry winter.

VISIT TO MR. R. C. SMITH'S, AT MODBURY, JULY 26, 1924.—Through the kind invitation of Mr. R. C. Smith, a large party visited Modbury, on Saturday, July 26, 1924, and were hospitably entertained by Mr. and Mrs. Smith. After viewing the interesting collections of Mr. Smith the party were driven to a most interesting patch of scrub, representing one of the last surviving portions of the foothill forest. A little gully was gay with the flowering *Hardenbergia* and golden wattle (*Acacia pycnantha*) and *Cassia sturtii*, *Grevillea lavandulacea*, *Senecio odoratus* and wild hops were also in flower. The members enjoyed the extensive view from the hill, though the afternoon proved very boisterous. Returning to the house, afternoon tea was served and a vote of thanks to the host and hostess ended a most enjoyable outing.

EXCURSION TO MARINO, AUGUST 9, 1924.—A party visited Marino, under the leadership of Mr. George Beck. The cliffs below the station proved a better hunting ground for wild flowers than might have been expected at this time of the year. Exposed as they are to the cold winds from the sea the plants are stunted in habit. One of the best illustrations of this is the Spoon Wattle (*Acacia obliqua*) which here forms only low bushes little more than a foot in height, though its natural habit is a small tree. It was found to be blooming profusely, the yellow, fluffy balls contrasting with the dark green leaves. The yellow flowers of *Velleia paradoxa*, with its curious little "tail" on the flowers was abundant. This flower should prove easy of cultivation. Plants continue to bloom almost all the year. Two orchids were secured, the beautiful blue *Thelymitra aristata* ("Scented sun-orchid") and the smaller *Diuris palustris*. Two varieties of wattles were in bloom, *Acacia obliqua* and *A. pycnantha*, the latter in sheltered gullies, which also gave the necessary protection to *Lotus australis*, *Dodonaea viscosa* ("Hop bush"), and *Scaevola aemula*. In places the wild lilac, *Swanisona lessertifolia*, was plentiful, and here and there the Scarlet runner (*Kennedyia prostrata*) was seen. *Senecio lautus* blossomed on the steep cliff sides, where also a few specimens of *Hakea ulicina* were found in flower, and a few plants of *Grevillea lavandulacea*. These were the chief plants secured during the afternoon. At the end of a pleasant ramble Mr. G. Beck entertained the party at afternoon tea, and the party caught the train at Marino station.

LECTURES, "WOOD AND ROCK-BORING MOLLUSCS," BY MR. W. J. KIMBER, AND "SOME COMMON MINERALS," BY DR. C. FENNER, F.G.S., MAY 29, 1924.—Mr. Kimber explained that these molluscs bored into wood and rock, not to obtain food but to protect the soft body of the mollusc against injury or attack. Most rock and timber borers belonged to the family *Pholadidae*, a mollusc which makes a very hard, but brittle white shell, with projections like the teeth of a rasp. When a suitable rock was found the young *Pholas* attached themselves by the foot muscles, and bored the hole, which it could not leave. It was generally admitted that the work of boring was done by the muscular foot, aided by the shell. Observation showed that the foot was used as a bradawl. The hardest rocks were pierced in this way. In the Bay of Naples the hard porphyry columns of the Serapeum had been penetrated by the agency of these tiny molluscs, and the hardest pearlshell exhibited its handiwork in the "blister" pearls by which the oyster strove to remove the irritation resulting from the unwelcome attention of the borers. These

borers had the problem of food supply solved by the circulation of the sea water, containing minute organisms and minerals, through an inhalent siphon. After the creature had extracted what it needed the purified water was expelled by the outgoing siphon. In this way these tiny creatures helped to maintain the health and purity of the sea. The *Teredo Navalis*, or so-called "shipworm," was really a mollusc with a bivalve shell to protect its vital organs. The ravages of this organism had been noted from earliest times. It made its home in wood, and lined its burrow with a calcareous tube. The hardest wood was not immune from its attack. Redgum was the most resistant. Two species were found in South Australian waters, four near the Victorian coast, and 30 to 40 had been identified in American seas. Many endeavours had been made in recent times to combat the devastation wrought by the teredo. Copper sheathing and iron nails arrested their ravages to some extent. In the United States of America the use of chlorin gas produced by electrolysis of sea water, by the agency of a floating electric battery, had proved successful for a time. It was not wise to keep jetty piles too clean, for the presence of *Serpulae* and accumulations of seaweed warded off the attacks of the borer. The *Teredo* had to its credit the rapid destruction of floating timber which might otherwise prove a serious danger to shipping.

The lecture was illustrated with blackboard diagrams and sections of piles from Largs Bay jetty and timber from the wreck of the *Star of Greece*, near Willunga, riddled by these "white ants of the sea."

Dr. C. Fenner followed with an instructive talk on some of the commoner minerals. Referring to Mr. Kimber's allusion to the tunnels bored in the columns of the Serapeum, the doctor said that these supplied conclusive evidence of the alternate sinking and elevation of the Italian coast; for it was only under water that the boring mollusc could work. The swamps at Port Wakefield, too, might be cited as proof of this change of level. Every known substance tended to assume the crystalline form, even water and air. The respective angles of its prisms determined the species of a mineral more surely even than did chemical analysis. The Mount Lofty Range consisted largely of quartz. The crystals were composed of a six-sided prism topped by a pyramid of the same number of faces. A close examination revealed striae, or scratches, across the faces of the prism. These were explained as resulting from the struggle between the prism-building molecules and the pyramid builders, each striving to build in its own way. No striae were found in the pyramid. Quartz crystals terminated with pyramids at each end, were believed to result from

the crystal being attached to the rock by the middle of the prism. "Cairngorm," used as ornaments, was a form of highly polished quartz. Twelve-sided garnets from the Malay States were shown, and their perfect symmetry was pointed out and admired. Crystals exhibited different habits or dispositions. Mica consisted of perfect crystals laid flat upon one another in laminae or plates. Asbestos, on the other hand, was composed of long narrow fibres, from which fireproof curtains and a silky kind of fabric could be woven. Galena (sulphide of lead) was arranged in perfect cubes, and when broken separated into tiny forms of a like structure. A topaz of pigeon-blue color found at the Hoffnung mine, Victoria, had been the subject of protracted litigation. Coorongite, from the Coorong, was a substance of leathery appearance which burned readily, and was once believed by the "man in the street" to indicate the presence of oil. Pelionite, from Mount Pelion, Tasmania, was a true oil shale. Although it did not burn readily, it gave out the characteristic bituminous odor. Tubes of "fulgurite" (lightning stone) were explained as caused by electric discharges into the sands of the shore. Specimens of obsidian or "blackfellows' buttons," picked up by Mr. E. H. Ising on the Nullabor Plains, were supposed to be due to a meteoric shower which had swept the southern half of the Australian continent. These were sold to the whites by the aborigines. Gold was not the most valuable of metals. Osmiridium (composed of the two metals osmium and iridium, and found in Tasmania) had a much higher commercial value. It was used for the hard tips of fountain pens. Radium, also, which had been discovered at Olary, on the Broken Hill railway line, was practically priceless. The phenomenon of the twinning of crystals was explained. The junction of two crystals in gypsum produced a peculiar arrow-headed crystal. A fossil shark's tooth, embedded in nummulite (coin shaped) limestone fossils and hot lava from Vesuvius, afforded further examples of crystallisation. The lucid explanations of Dr. Fenner was supplemented by illustrations on the blackboard, and samples of all the minerals discussed were handed round.

LECTURE, "GIPPSLAND RANGES AND LAKES," BY MR. H. HORSWILL, JUNE 17, 1924.—Professor J. B. Cleland presided. The lecture was illustrated by a large number of lantern slides of exceptional merit from photographs taken by the lecturer. A descriptive account was given of the trip from Melbourne to the lakes entrance and back. The grandeur of the mountain scenery was depicted and the magnificent forest covering of Mount Baw Baw and other places en route was shown on the screen. This district grows the largest trees in the world. Authentic records give the highest trees as 375 ft., which is the

giant gum (*Eucalyptus regnans*). Views of the entrance taken from an aeroplane were shown. The scenery was most enchanting. the forest growing down to the water's edge. The lecturer described vividly his walk through dense forest growth and his encounter with impassable jungle where he got badly stung with nettle plants and over which he had to climb his way monkey-fashion. Mr. J. F. Bailey exhibited native flowers from the Botanic Garden as follows:—Wheel of fire (*Stenocarpus sinuatus*), *Alyxia daphnoides*, of Norfolk Island, in fruit, a splendid shrub, the red berries of which last for months on the plant, several Grevilleas, *G. lavandulacea*, *G. oleoides*, *G. sericea*, and *G. rosmariniifolia*, all worthy of garden cultivation. *Buckinghamia celsissima*, of North Queensland, pink pin cushion (*Hakea laurina*), blue gum of Tasmania (*Eucalyptus globulus*), *Cassia Sturtii* var. *coriacea*, a beautiful cassia bush with golden flowers, desert bush (*Eremophila alternifolia*), white heath (*Epacris impressa*), and two species of native fuchsia (*Correa alba* and *C. rubra*). Professor Cleland exhibited two cylindrical aboriginal ceremonial stones from Strzelecki Creek, red sand from Cordillo Downs, and gall insect growths on the bloodwood tree.

POINTS OF INTEREST TO NATURE LOVERS.

Members will remember that the Section is trying to secure more land to be set aside as reserves and national parks in the hills. Residents of Mount Gambier and the surrounding district are also making an effort to have about 20,000 acres of land in the Hundred of Caroline set apart for a public park, a forest reserve, and a sanctuary for native flora and fauna. The nearest part to Mount Gambier would be eight miles, and the sanctuary would extend to the Glenelg River. At one time the land was stocked with kangaroos, native bears, flying squirrels and the spiney hedgehog; while in the river was the platypus and fish of many kinds, and in the woods were the bronzewing pigeon and parrots of gorgeous hue, and other birds. There were also wild flowers. All the beauties, both animate and inanimate, have been early exterminated. The scenery through the block to the river is very fine.

EXCHANGES.

"The Victorian Naturalist," May, June, July and August numbers.

"The South Australian Ornithologist," April and July numbers.

"The Queensland Naturalist," May number.

"The Australian Naturalist" (N.S.W.), July number.

BOTANICAL NOTES.

By ERNEST H. ISING.

Eremophila decipiens.

Eremophila decipiens, Ostenfeld, in "Contributions to West Australian Botany," Part III., in "Danske Videns Selskab." III., 2 (1921), p. 120, t. 12, fig. 2.

This is the first record of this plant in South Australia, as I obtained a specimen of it at Ooldea, on the East-West line, in September, 1920 (No. 1611). I submitted a specimen to Dr. C. H. Ostenfeld, of the Botanical Museum, Copenhagen, Denmark, and under date of August, 1923, he writes:—"Your plant agrees well with my *Eremophila decipiens* and I should name it so. There are small and insignificant differences, viz., the calyx lobes are somewhat longer and more acute in yours, but I do not think it of any importance. Kew Herbarium has many specimens of *E. decipiens* from the cremaean parts of West Australia, and it is quite natural that it also reaches to South Australia."

The type comes from Kalgoorlie and was collected on the 7th October, 1914, by Dr. Ostenfeld (l.c.). This West Australian locality is similar country to Ooldea.

Dr. Ostenfeld says:—"This new species comes near to *E. maculata* (Ker.) F.v.M., and has been confounded with it. It differs in the quite different tomentum, which in *E. maculata* consists of rather short and recurved single hairs forming a dense clothing on the young branches (the leaves are quite glabrous), while in the new species both the young branches and the young leaves bear a minute stellate pubescence. Further differences are found in the smaller calyx-lobes (in *E. maculata* longer and acuminate) and in the glabrous innerside of the corolla (in *E. maculata* with some long hairs), etc. The present species seems to be mostly a West Australian representative of *E. maculata* and is probably well distributed in the interior of the State, as far as I am able to judge from the numerous specimens in the Kew Herbarium. The true *E. maculata* F.v.M. (*Stenochilus maculatus* Ker., in Bot. Regist. tab. 647, 1822) seems to be mostly Eastern, but I do not know if it also occurs in West Australia. To my species perhaps belongs *E. maculata* var. *brevifolia* Benth. (Fl. Austr. V., 1870, 29), but the few words of the diagnosis do not say anything about the different kind of hairiness."

This species is also near *E. glabra* (R. Br.) Ostenf., in the foliage which is lanceolate in both, but I have specimens *E. glabra* with both larger and smaller leaves. The branches have similar clothing in both.

In my specimens of *E. decipiens* the flowers are red outside and cream inside; the calyx lobes lanceolate (ovate according to Ostenfeld's description), inside stellately pubescent with very short hairs (not stellato-pilosi).

"Acacia rhetinodes, Schlecht., Bald Wattle."

A form of the wirilda wattle *Acacia rhetinodes*, grows on the open hillsides and well away from the lower, wetter positions where the smooth-grey barked form flourishes. The former has black, rough, thick bark with one main trunk branching high up, while the latter branches early and almost at ground level. Although the habits of the two forms are so different the phyllodes, flowers and pods are almost identical. Mr. J. M. Black does not consider a new variety justified; however, further investigation should be undertaken, particularly by growing seedlings of both forms and comparing them. Mr. R. H. Cabbage, of Sydney, has done quite a lot of useful and important work with "Acacia seedlings" by growing the plants from seeds, and his results are published in the transactions of the Royal Society of New South Wales during the last several years. Here is an opportunity for a member to do some practical work and record it in our journal.

Chemistry of the leaves of the genus *Epacris*, Order Epacridaceae.

A friend of mine in Philadelphia, U.S.A., writes "that it will be interesting to determine if the leaves (of *Epacris*) contain the same specific principle that is found in the leaves of *Ericaceae*."

I do not know whether any such investigation has been undertaken here or in the other States, if not, here is an opportunity for some original work.

At the request of my Philadelphian correspondent I forwarded to him some leaves of *Epacris impressa* Labill., from Mount Lofty, and his reply should prove very interesting.

OUR FLOWER SHOW.

The show of native flowers and other specimens of natural history, will be held in the Town Hall, on October 10th and 11th. Members are asked to help on the Thursday preceding, and at any time during the Friday or Saturday that they can conveniently attend. Friends owning cars would greatly oblige if they could take some collectors into the hills a day or two before the show. Word should be sent to the Secretary or the Treasurer.

"The Trans-Australian Wonderland."—Every naturalist at least who has made the overland journey between Perth and Melbourne, or *vice-versa*, will be interested in this booklet of nearly one hundred pages, describing, with the aid of illustrations, some of the features of the Ooldea district. Its author, Mr. A. G. Bolam, station-master at Ooldea, has spent his spare moments profitably in jotting down what he has learned by his own observations, and what he has learned from the aboriginal inhabitants of the district about the beast, birds, reptiles, plants, etc., of his neighbourhood. Fishes cannot be included for the simple reason that Ooldea is hundreds of miles from any stream. Ooldea is about 425 miles west of Port Augusta, and it is situated just on the eastern edge of the wonderful Nullabor Plain, which stretches westerly for 450 miles—an almost dead level, treeless tract, covered by such dwarf salt-bushes and other vegetation which can exist on an annual rainfall of about eight inches. Ooldea is fortunate in being situated near a "soak," where underground water can always be obtained, and this has made it an important station on the line, and also a great meeting-place for the natives for hundreds of miles in either direction. Among the animals dealt with are the Marsupial Mole, Kangaroo Mouse, House-building Rat, Fat-tailed Mouse, Bandicoots, &c. The first-named animal is a little creature of about six inches in length; it is without eyes or ears, but possesses legs and feet, with which it is enabled to disappear into the sandy soil in a twinkling. The House-building Rats construct a home for themselves of fine sticks, sometimes as large as six feet in diameter and three feet in height—a seemingly wonderful performance for such small creatures; underneath is a tunnel home. Some remarkable lizards are to be met with among the sand-hills, such as the Mountain Devil (*Moloch*), a formidable-looking creature, but perfectly harmless, living on ants, flies, &c., and, becoming quite tame, are useful creatures about the house. The Frog or Barking Lizard is an extraordinary-looking animal, but quite harmless. The birds include the Wedge-tail Eagle, Wild Turkey, Cave Owl, &c. The latter bird lives in the caves and blow-holes of the Nullabor Plain. Quite a number of species of smaller birds are seen from time to time, while Cockatoos and Parrots often appear in large numbers, so that Ooldea cannot be considered quite devoid of interesting specimens of natural history. The vegetation is naturally of a kind that can withstand heat and droughts. Acacias, Myoporums, Cassias, Quandongs, are a few of the genera represented. The little volume concludes with an interesting description of the aboriginals of the district, both in their primitive state and since their contact with white men.

LIST OF MEMBERS.

FIELD NATURALISTS' SECTION.

Andrew, Mr. H. W.	Experimental Orchard, Berri.
Angel, Mr. Frank	C/o W. D. & H. O. Wills & Co., Adelaide.
Ashby, Mr. E.	Blackwood.
Alexander, Mr. J. J.	Jones Street, Nailsworth.
Allerton, Master	Hectorville.
Birks, Mr. N. B.	"Braestead," Park Terrace, Parkside.
Black, Mr. J. McC.	82, Brougham Place, North Adelaide.
Black, Mrs. A. D.	82, Brougham Place, North Adelaide.
Baker, Mr. W. H.	Ningana Avenue, Kings Park.
Beck, Mr. B. B.	Coles Book Arcade, Rundle Street, Adelaide.
Beck, Mrs. B. B.	Fullarton.
Beck, Mr. Geo.	Coles Book Arcade.
Benda, Miss C. A.	75, Kent Terrace, Kent Town.
Benda, Miss M. L.	75, Kent Terrace, Kent Town.
Burton, Mr. R. J.	North East Road, Walkerville.
Bailey, Mr. J. F.	Botanic Gardens
Baker, Miss Bessie	"Register" Office.
Bellchambers, Mr. T. P.	Humbug Scrub, via Smithfield.
Botting, Mr. F. W.	Rose Park.
Blackmore, Mr. P. E.	Osborne Avenue, St. Peters.
Baker, Mr. A.	North East Road, Hampstead.
Bayly, Mr. W. R.	Prince Alfred College, Kent Town.
Barclay, Mr. E. W.	Charles Street, Prospect.
Brundrit, Mr. B.	Forest Avenue, Black Forest.
Bushell, Mr. H. H.	C/o Harringtons Ltd.
Burdett, Mr. G.	Basket Range.
Blackmore, Mr. J. E.	21, Hewett Avenue, Rose Park.
Booth, Master Russell	Buxton Street, North Adelaide.
Benham, Miss	4, Fifth Avenue, St. Peters.
Cheadle, Miss	University, Adelaide.
Clark, Mr. F.	33, Parade, Norwood.
Colbert, Mr. H.	Payneham.
Campbell, Dr. T. D.	5, Edward Street, Norwood.
Carpenter, Mr. R.	Union Street, North Kensington.
Coles, Mr. H. B.	Althorpe Place, Glenelg.
Cleland, Prof. J. B., M.D.	University, Adelaide.
Correll, Sister	Matron, Magill Home, Magill.
Cornish, Mr. Dudley	70, Second Avenue, St. Peters.
Cass, Mr. T.	88, Rundle Street, Kent Town.
Croker, Miss Annie I.	St. Peter's College Girls' School Kermode Street, N.A.
Catt, Miss Mary C.	Newcastle Street, Alberton.
Carson, Miss E.	86, William Street, Norwood.
Cutlack, Miss Joan M.	15, Dutton Terrace, Medindie.
Cleland, Master Wm. P.	31, Wattle Street, Fullarton.
Drummond, Mr. E.	Davenport Terrace, Wayville.
Drummond, Mrs. E.	Davenport Terrace, Wayville.
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Dunn, Mr. V.	George Street, Payneham.
Deland, Mr. C.M.	24, Trevelyan Street, Wayville.
Dutton, Mr. H. H.	Anlaby, Kapunda.
Duffield, Mr. K. C.	Hilda Terrace, Hawthorn.
Duignan, Mr. V. J.	Northern Territory.

- Edquist, Mr. A. G.
 Elliott, Mr.
 Elliott, Mrs.
 Elston, Mr. A. H., F.E.S.
 Edmunds, Mr. H. J.
 Erpel, Mr. E. E.
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 Featherstone, Miss D.
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 Hosking, Mrs. J. W.
 Hosking, Miss Erica
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 Hayward, Mrs. W. T.
 Hudson, Mr. Hugh
 Hale, Mr. H. M.
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 Hurcombe, Miss
 Henderson, Miss I.
 Hughes, Mr. E. S.
 Halley, Dr. Gertrude
 Hussey, Mr. G. F.
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 Howie, Mr. L. H.
 Howie, Mrs. L. H.
 Hand, Mr. Bert
 Haigh, Mrs. John
 Horswill, Mr. H.
 Hunt, Miss
 Hall, Miss D.
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 Grange.
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 33, Buller Street, Prospect.
 9, Leicester Street, Hyde Park.
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 35, Dequetteville Terrace, Kent Town.
 35, Dequetteville Terrace, Kent Town.
 35, Dequetteville Terrace, Kent Town.
 The University, Adelaide.
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 Sydenham Road, Norwood.
 Sydenham Road, Norwood.
 Sydenham Road, Norwood.
 77, First Avenue, East Adelaide.
 Ruthven Mansions, Pulteney Street, Adelaide.
 Ruthven Mansions, Pulteney Street, Adelaide.
 48, Grenfell Street, Adelaide.
 Museum, Adelaide.
 "Willow Bend," Walkerville.
 195, Unley Road, New Parkside.
 Parade, Norwood.
 Melvin Chambers, King William St., Adelaide.
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 48, Fisher Street, Parkside South.
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- Ifould, Mr. Percy
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Moulden, Dr. Owen M.
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McNamara, Miss Beatrice
McGilp, Mr. J. Neil
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Newbery, Mr. A. K.
Niehus, Mr. L. D.
Nettlebeck, Mr. T. W.
Osborn, Prof. T. G. B.
Pearce, Mr. C.
Pearce, Mrs. C.
Price, Mr. F. J.
Pulleine, Dr. R. H.
Payne, Mr. S.
Page, Mrs. L. E.
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Pocklington, Miss R. A.
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113a, Gouger Street, Adelaide.
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Monmouth Road, Hawthorn.
Valmai Avenue, Kings Park.
Prospect Road, Prospect.
Yorketown.
3, Royal Avenue, Hyde Park.
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Glenelg.
High Street, Unley Park.
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C/o Savings Bank, Adelaide.
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College Avenue, Prospect.
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11, Arthur Street, Medindie.
"Origma," Kings Park.
Torrens' Road, Woodville Park.
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Walkerville Road, St. Peters.
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110, Grant Avenue, Toorak.
"Monreith," Sea View Road, Henley Beach.
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Kensington Gardens.

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 Fifth Avenue, East Adelaide.
 Adelaide Hospital.
 Hectorville.
 Hectorville.
 Hectorville.
 Education Department, Flinders Street.
 Payneham.
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REVIEWS.

"Flora of South Australia, Part II., *Casuarinaceae-Euphorbiaceae*," by J. M. Black. With illustrations by the author. This is the fourth volume in the series of 16 handbooks of the flora and fauna of South Australia to be issued by the British Science Guild (S.A. Branch). The present volume contains full botanical descriptions of many typical Australian families, including *Casuarinaceae* (Sheoaks—Mr. Black's spelling), the *Protea* family (Hakeas, Banksias, Grevilleas), the *Chonopodiaceae* (including saltbush, cottonbush, blue bush), and the *Leguminosae* (including all the peaflowers, clovers, wattles). Mr. Black has gone very thoroughly into the nomenclature of species, and quite a number of alterations have resulted. Misidentification and splitting up of species have been responsible for many changes. In *Loranthaceae* the species *Loranthus pendulus* is only recorded from Blackwood, in the Mount Lofty Range, whereas it was considered to be very widely spread in the hills and all parts of the State. The species so plentiful is *L. Miquelii*, a distinct form; the former should, I feel sure, be found in many other parts of the hills than Mr. Black records. Another change is *L. Preissii*, which takes the place of *L. linophyllus*. The illustrations in *Atriplex* and *Bassia* are very helpful, and one wishes that *Kochia* had been similarly treated. In *Bassia* quite a number of new species have been created by Messrs. Black and R. H. Anderson, who have thoroughly revised the genus. The name for the plant known as *Bassia enchylaenoides* is now correctly referred to *Enchylaena*

villosa. In Amarantaceae the genus *Ptilotus* has been altered partly to *Trichinium*, and a similar change in Portulacaceae has taken place with *Claytonia*, from which *Calandrinia* has been separated. The small family Illecebraceae has been merged with Caryophyllaceae. In Cruciferae *Capsella* partly and *Thlaspi* have been transferred to *Hutchinsia*. Several interesting changes have been made in Leguminosae. The plant previously known as *Daviesia horrida* is now referred to *D. brevifolia*; this is a fairly common plant in certain situations around Mount Lofty. *Eutaxia empetrifolia* had an earlier name, so now becomes *E. microphylla*. The well-known Sturt Pea is to lose its connection with Dampier, as this plant was given another name three years earlier, and, although it was under another genus (*Donia*) the specific name, according to botanical rules, must stand. The Sturt Pea must now be designated *Glianthus speciosus*. Mr. Black has revised *Swainsona* and added several new species. Another popular plant to have its name changed is *Correa speciosa* which is shown as *C. rubra*. The genus *Microcybe* in Rutaceae has been separated from *Eriostemon* and two species described. Our well-known heather is *Tetratheca pilosa*, and grows throughout the hills, while *T. ericifolia* is only recorded from Kangaroo Island where also Mr. Black records a new species *T. halimaturina*. The common coast plant previously called *Adriana quadripartita* is now correctly stated as *A. Klotzschii*. The Tepper Herbarium, which was recently donated to the section, was the means of placing *Phyllanthus Tatei* in its true position under *Micranthemum Tatei*. The only known specimens of this species are now in our possession. Still another alteration in Euphorbiaceae is the splitting up of *Beyeria opaca* into *B. Leschenaultii* and a variety. A new species from Kangaroo Island, *Beyeria subsecta*, is recorded.

PLANT SURVEY AND HERBARIUM.

Several meetings of the keepers of the Herbarium were held during the quarter and much work was accomplished in sorting out plants received. Parcels of flowers were received from the following:—

1. Moorland's School, collected by Margaret Evans and Eileen Miatke.
2. Mr. B. Hand, 19 specimens from Streaky Bay.
3. Mr. L. Reese, Minnie Downs, parcels Nos. 4 and 5.
4. Mr. F. S. Jones, Oodnadatta, 10 species.
5. Mr. J. A. Hogan, 30 species from Port Lincoln.

